

Carnation Sewer Collection and Conveyance System
and Wastewater Treatment Facility

Environmental Assessment

September 2005



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Prepared for:

Environmental Protection Agency
1200 Sixth Avenue
Seattle, WA 98101

This EA has been prepared for EPA in accordance
with the National Environmental Policy Act (NEPA)

Prepared by:



<http://www.ci.carnation.wa.us/>



King County

Department of
Natural Resources and Parks
Wastewater Treatment Division
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This information is available in
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CHAPTER 1. INTRODUCTION

1. PROJECT IDENTIFICATION

Name of Applicant: City of Carnation, Washington

Project Title: City of Carnation Sewer Collection and Conveyance System

Funding:

Vacuum Sewer Collection System

Total Eligible Cost: Estimate \$15,591,192.00

EPA/Federal Share: Estimate \$1,468,000.00

State Share: Estimate \$2,000,000.00

Applicant Share: \$14,123,192.00 (includes PWTF Loan dollars)

Wastewater Treatment Facility and Discharge

Total Eligible Cost: Estimate \$14,217,000.00

EPA/Federal Share: \$0.00

State Share: Estimate \$10,500,000.00 (PWTF loan)

Applicant Share: \$2,217,000.00

Estimated User Cost Per Household: \$155.14/Month

Median Family Income of Service Area: Estimate \$60,156 (Source: Puget Sound Regional Council 2000 Census)

Low Income/Poverty Income of Service Area: Estimate \$10,900 (Source: Puget Sound Regional Council 2000 Census)

This Environmental Assessment (EA) was prepared in accordance with the National Environmental Policy Act (NEPA) 42 USC 4321, which is required for projects receiving state and/or federal funding or permits.

2. BACKGROUND

The City of Carnation (the City) is located in the Snoqualmie Valley at the confluence of the Tolt and Snoqualmie Rivers in King County, Washington (Figure 1). All wastewater treatment in Carnation is currently provided by on-site sewage disposal systems that have been determined to be largely inadequate. The City is not currently served by a centralized wastewater treatment facility. In 1987, the Seattle-King County Department of Health (Public Health) declared a public health hazard in Carnation (Kleeberg, 1988) and discussed the need for a wastewater treatment plant. In 2003, Public Health restated the need for a wastewater treatment plant in Carnation. King County and the City of Carnation propose to construct a Carnation Wastewater Treatment Facility and Sewer Collection System, respectively. The facilities are interdependent.

Carnation incorporated as a city in 1912. Since that time, on-site wastewater treatment systems have been the only type of wastewater treatment and disposal used in the City. Most of these

systems are septic tanks and drainfields; however, some cesspools and seepage pits are still in use. The need for a wastewater treatment facility has been discussed and debated for more than 20 years. Acting on concerns that the on-site systems might not continue to meet the City's wastewater treatment and disposal needs, the City of Carnation prepared several city sewer plans and formed citizen sewer advisory committees. These activities led to the decision to build a centralized wastewater treatment system for the City.

The area proposed to be served by the wastewater treatment facility is confined to the City's Urban Growth Area (UGA). The UGA includes the area within the current city limits as well as three potential annexation areas (Figure 2). The proposed service area follows the City's UGA boundary in order to be consistent with the Washington State Growth Management Act (GMA).

To determine the necessary capacity of the treatment facility, the city's population growth was projected through the year 2050. The projection was based on historical growth rates, growth rates expected before and after sewer installation, zoning, expected distribution of population to identified sewer basins, and a breakdown of expected population by residential, employment, school, and park segments. The treatment plant capacity was based on the projected maximum monthly flows of about 400,000 gallons per day in 2027, with the ability to expand to a capacity of 450,000 gallons per day by 2050.

3. PURPOSE

The purpose of the project is to build a centralized wastewater treatment plant, a sewage collection system within the city, and a conveyance pipeline and outfall into the Snoqualmie River to discharge highly treated water.

As long ago as 1988, the need for a sanitary sewer system and wastewater treatment facility in Carnation was substantiated. A letter from Seattle-King County Public Health to the Mayor of Carnation (Kleeberg, 1988) states that Dr. Bud Nicola, then Director of the Environmental Health Division, declared a public health hazard in Carnation on December 2, 1987, for two reasons:

- The existing on-site sewage disposal in Carnation was inadequate.
- Soil conditions in Carnation, in conjunction with on-site sewage disposal practices, allowed untreated sewage to enter the groundwater aquifer that is used for drinking water.

Inadequate on-site wastewater disposal includes cesspools and seepage pits, which are defined by the Code of the King County Board of Health (Title 13) as "...a pit or receptacle which receives untreated wastewater and allows the liquid to seep in the surrounding soil or rock...." The code further states that any of these systems is considered a "failure" which can threaten public health by inadequately treating sewage...." These conditions are present in Carnation. Please see Appendix G for a copy of the letter from Seattle-King County Public Health to the Mayor of Carnation (Kleeberg, 1988) and further details on the condition of on-site septic systems in the City of Carnation.

In the 17 years since the public health hazard declaration, no substantive changes have been implemented in Carnation to remedy the basic on-site sewage disposal practices. The on-site septic systems in place in the late 1980s are largely still in operation today, and in a few areas, new on-site systems have been added. On September 9, 2003, Public Health sent a second letter reiterating the statements made in the 1988 letter. The letter specifically stated that a sewer system for the City of Carnation remains the most viable solution for the long-term protection of the public's health (Bishop, 2003). A copy of this letter is included in Appendix G.

The *City of Carnation 1996 Comprehensive Plan* (Carnation Comprehensive Plan) (City of Carnation, 1996 and 2003), which was adopted in 1996 and amended in 2003, recognizes the public health concerns related to the inadequate treatment provided by the on-site sewage systems in the City. The Carnation Comprehensive Plan also recognizes the steadily increasing population growth and the need to manage growth. To address these concerns, the Carnation Comprehensive Plan outlines the City's long-term wastewater treatment need for the current and future city population, and establishes goals and policies that call for a wastewater treatment plant (King County, 2004).

The process to rectify the public health and environmental threat, and to develop the proposed sewer system, began when the City completed its draft *Comprehensive Sewer and Facilities Plan* in 2000; this plan assesses the feasibility of alternative methodologies for the sewer conveyance system as applicable to the City's particular circumstances. In April 2002 the City completed its *Supplement to the 2000 Comprehensive Sewer and Facilities Plan*, which further identifies the basic vacuum sewer option with a small number of grinder pump (station) services to provide the most cost-effective system to the City's residents.

By providing a sanitary sewer and wastewater treatment system, the City will address the public health hazard identified by Seattle-King County Public Health. The entire City, including residences and commercial establishments, are currently served by on-site septic systems. The vast majority of the existing lots are less than the nominal 20,000 square feet that are required by current Public Health design standards for on-site septic systems. In most cases, the lot sizes are too small to permit the construction or replacement of on-site septic systems.

The introduction of untreated sewage into the groundwater aquifer, as noted in the 1988 Public Health letter, also poses environmental threats to the Snoqualmie and Tolt Rivers, which are adjacent to the City to the west and south. Specific environmental threats include the introduction of nutrients (algae growth stimulation), organic material (oxygen depletion due to biochemical oxygen demand), and bacterial contamination. The centralized sewer system and treatment facility would eliminate the environmental threat of contamination to these rivers from failed and inadequate on-site septic systems.

Besides public health and environmental threats, the lack of a public sewer and treatment system has had ongoing negative impacts on the economic health and growth of Carnation and on the City's ability to plan for urban densities under state GMA guidelines. The GMA requires King County to designate urban growth areas (UGAs) within which urban growth will be encouraged, and outside of which growth can occur only if it is not urban in nature. A UGA as defined by GMA includes compact development densities and urban facilities such as a wastewater treatment plant. A wastewater treatment facility is required to accommodate population and

housing demand sufficient to permit the urban growth as outlined in Carnation's Comprehensive Plan (1997). The lack of a public sewer and treatment system inhibits commercial and residential development and, in many cases, redevelopment in the City. Several businesses in the City have been closed because they were unable to rebuild or expand as a result of inadequate or unavailable wastewater treatment. This in turn has had a negative impact on the economic health and development of the community, and a reduction in the City's tax base.

To satisfy the project need as stated below, the City proposes to minimize environmental impacts and provide a cost-effective wastewater system for Carnation residents.

4. NEED

The need for the project is driven by the following factors: (1) protect groundwater quality and public health from the adverse impacts of inadequately functioning on-site sewage systems; and (2) comply with the requirements of the state GMA.

CHAPTER 2. DESCRIPTION OF ALTERNATIVES

1. ALTERNATIVE 1 – NO ACTION

Under the No Action Alternative, the City and King County would not pursue design and construction of a city-wide sewage collection, conveyance, treatment, and disposal system. Wastewater treatment in Carnation would continue to be provided by on-site treatment and disposal systems. On-site septic systems would continue to treat wastewater by soil filtration and discharge to groundwater. No centralized treatment facility would be constructed, and no highly treated water from such a facility would be discharged to the environment. Also, without the wastewater treatment facility, the collection and conveyance system would not be built.

2. ALTERNATIVE 2 – PREFERRED ACTION ALTERNATIVE (VACUUM SEWER SYSTEM AND WASTEWATER TREATMENT FACILITY)

The preferred action alternative consists of a vacuum sewer collection system in the City of Carnation, a wastewater treatment plant, and a conveyance pipeline for highly treated water discharge into the Snoqualmie River.

The vacuum sewer system would consist of a network of buried vacuum pipelines to form the collection system within the City. One combination vacuum station / pump station would be located on the treatment plant site and serve as the vacuum source for the entire collection system. All of the wastewater would be transported from individual homes and non-residential users (i.e., businesses, schools, etc.) through the vacuum collection system into a vacuum tank located within the vacuum/pump station. From the vacuum/pump station, pumps would pump the wastewater from the vacuum tank to the treatment plant. The wastewater would be treated at the treatment facility, and the highly treated water would be piped through a conveyance pipeline to an outfall into the Snoqualmie River.

Upon completion of the project, approximately 690 connections (representing approximately 1,905 residents, as well as schools and commercial enterprises) would be connected to the new sewer system. These connections are currently using on-site disposal systems.

a. Vacuum Sewer System

Vacuum sewer systems combine the principles of gravity sewer operation with a central vacuum station (or stations). The vacuum sewer collection lines can be installed at shallower depths than conventional gravity systems. The connection interface between a building's side sewer and the vacuum system would be in a buried "pit" with a vacuum valve. Each vacuum valve pit typically provides sewer service to two customers, with the potential to serve up to four residences. For the businesses in Carnation, typically one service is planned for each valve pit. Each valve pit has a maximum capacity of approximately 30 gallons per minute (gpm).

The vacuum conveyance system would include some areas pumped through smaller grinder pump systems due to topographic constraints. Since the grinder systems cannot directly discharge into the vacuum system, buffer tanks would be required at each of these inputs.

The vacuum sewer collection system would consist of approximately 14,526 feet of 10-inch-diameter, 8,946 feet of 8-inch-diameter, and 8,610 feet of 6-inch-diameter PVC vacuum sewer interceptor/trunk lines; 22,835 feet of 4-inch-diameter PVC vacuum sewer collector pipe; and 5,100 feet of PVC force main (1.5-inch, 2-inch, and 3-inch diameters). The vacuum sewers would be laid with 3 to 5 feet of cover.

As mentioned above, one combined vacuum/pump station would pump the wastewater from the City's vacuum sewer system to the County's treatment plant. The vacuum/pump station would likely be located near the treatment plant site and be equipped with an emergency standby power generator. The termination point for the proposed vacuum sewage collection system would be the combined vacuum/pump station. From this station, flow would be pumped to the adjacent wastewater treatment plant for processing.

Also included in the design are approximately 11 grinder pump stations that would serve a few of the remote customers who cannot practically be served by the vacuum system. The project would include a telemetry system for the City's new sewer facilities.

The City's Facility Plan determined that the advantages of the vacuum sewer system are shallower construction depths, smaller pipe diameters, less surface disruption during construction, and less potential for odors due to the closed system. Disadvantages include higher operation and maintenance costs, difficulty finding and isolating problems in the system, the system requires power to operate, and not all portions of the City can be served by the vacuum system.

b. Wastewater Treatment Facility

The design of the wastewater treatment facility is discussed in the *Carnation Wastewater Treatment Facility Final SEPA EIS* (King County, 2004). The plant facility would consist of the treatment process, which includes primary and advanced secondary treatment, odor control facilities, and support facilities.

The plant would provide initial treatment capacity for a maximum monthly wastewater flow of about 400,000 gallons per day (gpd). The plant would be designed so that its capacity could be increased to about 450,000 gpd to meet the needs of the service area when the area is fully developed.

Treatment plant facilities would be placed within an approximately 5-acre area. The preferred site for the treatment plant is a City-owned 10-acre parcel located on the west side of Carnation at the end of Entwistle Street. In total, these facilities would cover about 15,000 square feet. This plant "footprint" would not change as the plant's capacity increased because the facilities would be initially sized to accommodate future capacity increases. When needed, additional capacity would be added by installing new equipment inside existing buildings.

The treatment process would consist of six stages: coarse screening, grit removal, fine screening, biological nutrient removal, membrane bioreactors (MBRs), and UV light disinfection with ultraviolet light. The MBR technology is one of the best available technologies for treating municipal wastewater and generally achieves better water quality than conventional secondary wastewater treatment. The MBR treatment process would produce high quality water, which would meet or exceed all applicable standards. For these reasons the water produced by the treatment plant is referred to as “highly treated water” throughout this document. Washington State regulators would set the discharge water quality standards through a National Pollution Discharge Elimination System (NPDES) permit. It is anticipated that NPDES standards applied to the discharge water would be the same as or similar to conventional secondary wastewater treatment standards.

The highly treated water produced by the treatment plant would be conveyed in a pipeline to the outfall discharge location in the Snoqualmie River at the Carnation Farm Road Bridge (located about one mile north of Carnation). The water would be discharged through a diffuser at the end of the 8-inch ductile iron effluent pipe that would extend from the northeast side of bridge down the northwest bridge support pier (Figure 3). As shown in Figure 3, the diffuser would be positioned above the riverbed.

A 1.6-mile, 12-inch-diameter conveyance pipeline would deliver highly treated water from the treatment plant to the river discharge location. The pipeline route runs from the City-owned treatment plant site a short distance east on Entwistle Street to Stewart Street, then follows Stewart Street and a private road north to 310th Avenue NE. The route then follows 310th Avenue NE west and north to the outfall at the Carnation Farm Road Bridge. The conveyance pipeline would be buried between 3 and 8 feet below ground surface. The majority of the pipeline length would be constructed by performing open-cut excavations using a backhoe and a pipeline route excavation (trench) box.

Figure 4 provides a map of the proposed vacuum system alignment, the new wastewater treatment plant location, and the conveyance pipeline and outfall in the Snoqualmie River. Refer to Chapter 3 of the *Carnation Wastewater Treatment Facility Final EIS* (King County, 2004) for more details about the proposed wastewater treatment plant and discharge.

3. CITY OF CARNATION SEWER SYSTEM ALTERNATIVES CONSIDERED BUT ELIMINATED

During the early design alternatives review process, two methods of providing sewer service were considered and one was eliminated from further consideration. The alternative eliminated from further consideration is summarized below.

a. Gravity Sewer System

The most traditional method of sewer collection service is conventional large-diameter gravity sewers. The gravity sewer system would consist of a network of buried pipelines to form the collection system within the City of Carnation, similar to that described above for the vacuum sewer system.

Gravity main diameters would range from 8 inches to 15 inches. Individual areas (including some large customers) would use grinder pumps to transport sewage to the gravity system. Sewage would flow through the gravity system to a lift station sized to accommodate the peak flows. The lift station would then pump the sewage through a 6-inch-diameter force main to the treatment plant site.

Advantages of the gravity system include low operation and maintenance costs, and greater reliability. Disadvantages include the need for greater capital investment, the need for deeper excavation depths during construction (standard minimum depth is 7 feet), the likelihood of large-scale dewatering operations during construction, the need for manholes, the potential vulnerability to infiltration/inflow in areas with a high groundwater table, and the incapability of some of the service area to be served by gravity sewers.

Based on the cost comparison provided in the *City of Carnation 2004 Sewer Facilities Plan* (Roth Hill, 2005), the gravity system alternative would be more expensive than the vacuum sewer alternative and result in greater disruption to area residents during construction. For these reasons, the Carnation City Council unanimously approved Agenda Bill AB02-21, determining that a vacuum sewer system is the preferred alternative for wastewater collection for the City.

4. KING COUNTY WASTEWATER TREATMENT FACILITY ALTERNATIVES

The *Carnation Wastewater Treatment Facility Final EIS* (King County, 2004) included review of a second treatment plant site and two additional discharge options. In April 2004, King County proposed, and the Carnation City Council adopted a decision process for selecting the treatment plant site, conveyance route and discharge location. The decision process outlined the factors to be considered, including cost, engineering, community, environmental, and policy issues. The treatment plant and discharge alternatives eliminated through this process are summarized below.

a. Treatment Plant Site

The second treatment plant site considered was referred to as the Weckwerth site in the *Carnation Wastewater Treatment Facility Final EIS* (King County, 2004). The site is a privately owned 5-acre parcel on the south edge of the City immediately east of the fire station. This flat, rectangular parcel has been graded and is mainly used for equipment and materials storage and vehicle parking. There is a house near the western edge of the parcel. The site is zoned for light industrial and manufacturing use. The site is bordered on the north by the Tolt Middle School, on the west by the fire station, on the east by a concrete fabrication facility and on the south by undeveloped private land. This site was not selected for construction of the treatment facility because it would require acquisition of private property, which would add to project expense.

b. Discharge Alternatives

Upland and wetland discharge alternatives were also considered in the *Carnation Wastewater Treatment Facility Final EIS* (King County, 2004). Each of these alternatives is described below.

The upland discharge alternative consisted of discharging the highly treated water produced by the treatment plant into constructed infiltration basins. These basins would be sited in the 240-

acre upland discharge study area located southeast of Carnation, just southeast of the intersection of NE 24th Street and 328th Avenue NE. About 160 acres of the study area is in forest production, and the other 80 acres is rural residential land. Surrounding land uses are rural residential, forest production, and group camps. The upland discharge site would occupy up to 10 acres somewhere in the study area. The upland disposal alternative was not selected due to unsuitable soil conditions in the proposed discharge area.

Under the wetland discharge alternative, the highly treated water would be conveyed to the Washington State Department of Fish and Wildlife's Stillwater Wildlife Area. This approximately 450-acre area is located about 2 miles north of Carnation between the Snoqualmie Valley Trail on the north and east and the Snoqualmie River on the south and west. Harris Creek and a smaller unnamed stream cross the area, passing through several of the oxbows before discharging to the Snoqualmie River.

Due to lack of funding, this option is not being considered as part of the EA. King County staff are continuing to pursue the wetland discharge through seeking grant funding and developing partnerships agreements with funding entities and other groups interested in wetland conservation. Should funding become available at a future date, the City of Carnation and King County Wastewater Treatment Division may revisit this alternative as a potential discharge option. Implementation of the wetland discharge alternative would include appropriate federal, state, and local government environmental review and permitting.

Please see Chapter 3 of the *Carnation Wastewater Treatment Facility Final EIS* (King County, 2004) for more details about alternatives considered but eliminated from further consideration for the wastewater treatment facility.

CHAPTER 3.

DESCRIPTION OF EXISTING ENVIRONMENT

1. STUDY AREA DESCRIPTION

The City of Carnation and its UGA are approximately 800 acres (1.25 square miles) in size and roughly centered on State Route (SR) 203 (Tolt Avenue) and Entwistle Street/NE 45th Street in King County northeast of the confluence of the Tolt and Snoqualmie Rivers. Approximate boundaries of the project study area are the Snoqualmie River to the west, NE 60th Street to the north, the Tolt River and NE 32nd Street to the south, and 328th Avenue NE to the east (see Figure 2).

The study area is comprised primarily of land uses typical of urban development, including residences, streets and sidewalks, several schools, and city parks, with commercial businesses located primarily along SR 203 in downtown Carnation. Most of the study area is landscaped with maintained lawns with small areas of shrubs and trees. Loutsis Park, located in the central portion of town, has a large area of trees with maintained lawn as the understory. The linear King County Snoqualmie Valley Trail, also located in the central portion of town, consists primarily of gravel pathway with an approximately 20- to 30-foot border of native trees and shrubs along both sides of the trail. Both Carnation Elementary School and Tolt Middle School have large areas of maintained lawn in the playfields and relatively large areas of trees. A few areas of undeveloped pastureland occur along the western edge of the study area, and native forested areas occur in the eastern portion of the city.

a. Soils and Geology

The King County Soil Survey (U.S. Soil Conservation Service, 1973) generally classifies soils in the project area as part of a group of soils known as the Oridia-Seattle-Woodinville Association (American Engineering, 2000). This soil group occurs in major stream valleys or nearby level areas. Major soil types within this group include Oridia soils, Seattle soils, and Woodinville soils. In general, soils in the Oridia-Seattle-Woodinville Association are well suited for farming and pasture. However, poor drainage and a seasonal high water table result in moderate to severe limitations for urban development and make site preparation more costly.

A city-wide study of geological conditions determined that the geology underlying Carnation is composed mostly of relatively thick accumulations of post-glacial and glacial deposits over Tertiary, sedimentary, and igneous rocks (Kleinfelder, 2003; R.W. Beck and Associates, et al., 1991). Existing data on the City's geology indicate that the surface geology is composed of sand and gravel deposited during migration of rivers and streams. Flooding from the adjacent Tolt and Snoqualmie Rivers has left deposits of finer materials and alluvium on top of the sand and gravel.

Geotechnical and Seismic Considerations

A geological study was conducted by Kleinfelder, Inc. in December 2003 for the *City of Carnation Sewer Comprehensive Plan*. The study noted the surface grade is relatively flat throughout the area. Surface soils were generally topsoil or forest duff, native silty sands, and

gravels or gravel surface course. Subsurface conditions generally consisted of fill and alluvium, which was composed of sands, gravels, and silts with isolated clay lenses.

The study reported low liquefaction potential within the city limits based on anticipated depth to groundwater and field data collected. In the event of a seismic occurrence, it is anticipated that liquefaction settlement would be less than one inch.

Refer to Chapter 4 of the *Carnation Wastewater Treatment Facility Final EIS* (King County, 2004) for more details on soils and geology in the project study area.

b. Air Quality

Existing air quality in the project area is typical of urban residential, commercial, rural, and agricultural areas. Sources of air pollutants in the project area include emissions from automobiles, wood smoke from fireplaces, and emissions from yard maintenance equipment. Occasional or seasonally occurring odors and dust from agricultural activities (e.g., livestock operations or tilling) may occur in rural and agricultural areas (King County, 2004).

The project area is located in the central part of King County, which is classified by the Environmental Protection Agency (EPA) as a “maintenance area” due to a violation of the standards for carbon monoxide and ozone. These violations were caused by emissions from automobiles, wood smoke from fireplaces, and emissions from yard maintenance equipment, with occasional or seasonally occurring odors and dust from farm and livestock operations. The standards for carbon monoxide and ozone are currently being met, and the EPA is monitoring the project areas under a State Implementation Plan for air quality standards (King County, 2004).

Refer to Chapter 5 of the *Carnation Wastewater Treatment Facility Final EIS* (King County, 2004) for more details on air quality.

c. Surface Water

The major surface water body in the project area is the Snoqualmie River, which generally flows from the southeast to northwest and is located on the western edge of the City. The Snoqualmie River watershed drains more than 700 square miles in King and Snohomish Counties before joining the Skykomish River to form the Snohomish River. The upper drainage basin is mainly forestland managed by the U.S. Forest Service or private entities, along with commercial and residential pockets of development. Population centers and mixed agricultural uses such as dairies, berry fields, pastures, and row crops are numerous throughout the lower valley (Ecology, 1994). Snoqualmie Falls is a predominant feature of the river 17 miles upstream of Carnation at river mile (RM) 40.4. The Snoqualmie River system is highly valued for its recreational, aquatic habitat, and domestic water supply uses (Ecology, 1994).

Under existing surface water quality regulations, the Snoqualmie River and its tributaries are designated Class A (excellent) waters (Chapter 173-201A WAC). Portions of the Snoqualmie River, including the study area, are included in the 2004 list of impaired water bodies for temperature, fecal coliform bacteria, dissolved oxygen, pH, and ammonia (Ecology, 2005). King County has been monitoring ambient water quality in the Snoqualmie and Tolt Rivers since 2003. A summary of these data can be found in Appendix A of the *Carnation Wastewater Treatment Facility Draft Environmental Impact Statement* (King County, 2004).

The Tolt River, which drains a 101-square-mile basin, is the largest tributary to the lower Snoqualmie River. The Tolt River enters the Snoqualmie River just south of Carnation at RM 24.9 (Figure 5). The land in the upper reaches of the Tolt River watershed is forested. The Tolt River watershed is sparsely developed with roads and residences (Haring, 2002).

d. Floodplains

The City is located at the confluence of the Tolt and Snoqualmie Rivers, both of which have mapped floodplain areas. Portions of the vacuum sewage collection system and the conveyance pipeline and outfall would be installed in area mapped by the Federal Emergency Management Agency (FEMA) as 100-year floodplain and floodway.

Based on King County GIS data, the proposed wastewater treatment plant site is partially within the Snoqualmie River 100-year floodplain (approximately 7 acres). Detailed floodplain surveys have not been conducted, and FEMA floodplain studies are under revision. No portion of the proposed plant site is located within the Snoqualmie River floodway. As defined by King County Zoning Code (Title 21A.06), a *floodplain* is the total area subject to inundation by the base flood. A *floodway* (zero-rise) is the channel of a stream and that portion of the adjoining floodplain that are necessary to contain and discharge the base flood flow without any measurable increase in flood height.

The existing conceptual design and flood maps indicate that the treatment plant and access routes to the site could be located within the easternmost portion of the site, outside of the Snoqualmie River 100-year floodplain. Portions of the conveyance pipeline and outfall are within the Snoqualmie River 100-year floodplain.

Refer to Chapter 6 of the *Carnation Wastewater Treatment Facility Final EIS* (King County, 2004) for more details on floodplains.

e. Groundwater

The project area is located within the East King County Ground Water Management Area (East King County Ground Water Advisory Committee, 1998a). Most of the valley surrounding the City of Carnation is designated as a critical aquifer recharge area and recognized in King County's GMA and critical aquifer recharge ordinance (Carollo, 2003b). The City operates a single drinking-water well inside the city limits (depth of about 110 feet) with fewer than 1,000 service connections (East King County Ground Water Advisory Committee, 1998b). Springs furnish approximately 90 percent of the City's drinking water (East King County Ground Water Advisory Committee, 1998b).

While site-specific explorations have not been conducted, the groundwater table is reported to be fairly shallow, generally within 5 to 10 feet below ground surface (bgs). The King County Soil Survey (U.S. Soil Conservation Service, 1973) indicates that seasonally high water tables in the floodplain in the Carnation area are approximately 1 to 3 feet bgs. A geological study was conducted by Kleinfelder, Inc. in December 2003 for the *City of Carnation Sewer Comprehensive Plan*. The study reported that groundwater was encountered at only one test pit

location, at 6 feet bgs. Groundwater was not encountered at other test sites throughout the project area at depths to 7 feet.

Refer to Chapter 6 of the *Carnation Wastewater Treatment Facility Final EIS* (King County, 2004) for more details on groundwater. The public drinking water supply is discussed below under Public Services and Utilities.

f. Vegetation

The project area encompasses a range of vegetation types. The vacuum sewer system would be located primarily in existing City rights-of-way, with some easements required. In easement areas, vegetation consists of lawns and gardens. Only two ornamental trees in a residential area would be removed as part of the project; no trees that serve as wildlife habitat would be removed as part of the project.

The *Carnation Wastewater Treatment Facility Final EIS* (King County, 2004) reported that the treatment plant site consists of upland grasses. Vegetation on the site, which is periodically mowed, is dominated by tall fescue and thistle with patches of Himalayan blackberry. A few trees are located at the northern boundary of the site.

Vegetation near the river discharge location includes upland forest, upland shrub, upland grassland, and developed areas. A narrow band of upland forest with an upland shrub understory occupies most of the riparian zone in this area. There are no trees in the immediate vicinity (within approximately 50 feet) of the bridge and discharge location. The banks of the river near the bridge are vegetated with reed canarygrass, Himalayan blackberry, red osier dogwood, butterfly bush, willow, and black cottonwood (King County, 2004).

Refer to Chapter 7 of the *Carnation Wastewater Treatment Facility Final EIS* (King County, 2004) for more details on vegetation.

g. Wetlands

The Carnation city limits and UGA, along with areas outside the City where the conveyance pipeline and outfall would be located, were studied for the presence of wetlands.

Various sources were used to determine the extent of wetlands within the city limits and UGA. The Washington Department of Ecology digital sensitive areas map and the Washington Department of Fish and Wildlife (WDFW) Priority Habitat Site map identify potential wetlands as occurring in the playfield on the eastern side of Tolt Middle School, in the playfield and forested area of Carnation Elementary School, and in the undeveloped pastureland at Stewart and Entwistle streets. The Carnation Comprehensive Plan wetland map identifies two small potential wetland areas in the City, which were investigated in the field. All but the small area in the southwestern portion of the City were determined to be upland based on the dominance of upland vegetation, lack of wetland soils, and/or lack of wetland hydrology.

During the field reconnaissance, two additional pond areas were identified in the southwestern portion of the City. The westernmost wetland in the city is a small wetland area connected via a

culvert under SR 203 to the large wetland system that extends outside the study area on the western side of SR 203. The other two ponded areas appear to have been constructed and are located along the southern edge of the city. These are primarily open water areas with steep banks. A narrow border of wetland vegetation along the banks of the ponds includes scattered patches of common cattail and soft rush. Vegetation along the pond banks includes scattered saplings of red alder, black cottonwood, and willow, with patches of Himalayan blackberry.

Each pond fits the Class II wetland definition because they are estimated to be larger than 1 acre in size with two habitat types. The City has a range of buffers of 100 to 200 feet for Class II wetlands. All of the observed wetlands, including their buffers, are located a minimum of 500 feet from the proposed collection and conveyance system alignment (Figure 6).

No wetlands are mapped or have been identified on the treatment plant site or within the Snoqualmie River channel or along the shoreline in the vicinity of the proposed river discharge location (King County, 2004). Following a field visit, the U.S. Army Corps of Engineers confirmed the King County portion of the project, which includes the treatment plant and outfall piping, will not result in dredging or filling in navigable waters or jurisdictional wetlands (Kunz, 2005).

h. Fish and Wildlife

Landau Associates conducted a study in 2004 to investigate the presence of wetlands, streams, and sensitive areas in the vicinity of the proposed City vacuum sewer system alignment. Several areas of habitat were observed during the study, including the forested habitat of Loutsis Park and the forested corridor in the King County Snoqualmie Valley Trail Park. Although these areas are partially developed with walkways and are used regularly for recreation, the trees provide habitat for birds. Bird species observed in these parks include dark-eyed junco, rufous-sided towhee, common bushtit, golden-crowned kinglet, Stellar jay, and American crow. Pacific tree frog vocalizations were also noted along the Snoqualmie Valley Trail. The Snoqualmie Valley Trail is expected to serve as a migration route for birds, small mammals, and deer traveling to and from the Tolt River and its adjacent riparian habitat. Refer to the *Sensitive Areas Reconnaissance for Sewer Collection and Conveyance System, Carnation, Washington* (Landau, 2004) for additional details.

The treatment plant site is vacant and consists of upland grassland habitat. No federally or state-listed special-status species or priority habitats have been mapped by the federal government or WDFW within the boundaries of the City-owned site. The site is more than 1 mile from the documented occurrences of special-status bird species. The site is within a larger general area where bog clubmoss, a state sensitive species, has previously been documented. Mapped priority habitats (riparian areas and wetlands associated with the Snoqualmie River) are located off-site to the west.

The riverbanks at the river discharge site may provide burrowing habitat for aquatic mammals such as beavers. The riparian habitat is likely used by songbirds and raptors. A bald eagle nest is located within 1 mile of the river discharge site, and bald eagles overwinter at the Stillwater

Wildlife Area (WDFW, 2003; Young, personal communication, 2004). A former great blue heron nesting colony is also located within approximately 1 mile of the site. The great blue heron colony was last known to be active in 1999. No nesting activity was observed at the colony by WDFW staff in 2003 (Brookshire, personal communication, 2004). The site is within a larger general area where bog clubmoss was previously recorded. Riparian areas are considered a priority habitat by WDFW. Wetlands and streams are further discussed in the following sections.

The City classifies fish and wildlife habitat conservation areas as critical areas (CMC 15.88.500). Conservation areas are defined as habitat areas that meet any of the following criteria: documented presence of species listed by the federal or state government as endangered, threatened, or sensitive; sites containing bald eagle habitat as mapped by WDFW; sites containing heron rookeries or active nesting trees; or all waterways which meet the criteria for streams set forth in WAC 222-16-031. All areas within the City meeting one or more of these criteria are designated critical areas and are subject to provisions of the Critical Areas Code (CMC 15.88). Wildlife habitat observed within the study area is shown on Figure 6.

i. Threatened and Endangered Species

The Biological Assessment prepared for both the proposed City of Carnation vacuum sewer system and King County wastewater treatment facility describes baseline conditions and potential effects to Endangered Species Act (ESA)-regulated fish and wildlife that may be present in the vicinity of the action (King County, 2005). Information provided by the National Oceanic and Atmospheric Administration (NOAA) Fisheries and U.S Fish and Wildlife Service during the Biological Assessment preparation indicates that the project would occur within the general range of the species listed in Table 1.

Table 1. Threatened Species in Project Area

Common Name	Scientific Name	ESA Status*
Chinook salmon	<i>Onchorhynchus tshawytscha</i>	Threatened
Bald eagle	<i>Haliaeetus leucocephalus</i>	Threatened
Bull trout	<i>Salvelinus confluentus</i>	Threatened
Canada lynx	<i>Lynx canadensis</i>	Threatened
Gray wolf	<i>Canis lupus</i>	Threatened
Grizzly bear	<i>Ursus arctos</i>	Threatened
Marbled murrelet	<i>Brachyramphus marmoratus</i>	Threatened
Northern spotted owl	<i>Strix occidentalis caurina</i>	Threatened
Marsh sandwort	<i>Arenaria paludicola</i>	Threatened
Golden paintbrush	<i>Castilleja levisecta</i>	Threatened

***Threatened:** Species are likely to become endangered within the foreseeable future.

The project Biological Assessment, included herein by reference, provides extensive detail and analysis on threatened and endangered species.

j. Recreation

There are several recreational opportunities for residents and visitors within Carnation and surrounding areas, including a King County trail, city parks, and playfields, and a wildlife area.

Valley Memorial Park, the Tolt River-John McDonald Park, the King County Snoqualmie Valley Trail, and the Tolt and Snoqualmie Rivers offer recreational opportunities in the area. The Girl Scouts operate Camp River Ranch south of the Tolt River, adjacent to Remlinger Farms. Visitors can purchase fresh produce and farm raised products and also use picnic facilities and a petting farm at Remlinger Farms.

See Chapter 11 of the *Carnation Wastewater Treatment Facility Final EIS* (King County 2004) for more details on recreation in the Carnation area.

k. Visual Aesthetics

Carnation is located in the Snoqualmie Valley, and is surrounded by a rural and agricultural environment. The City is largely developed at densities typical of small rural cities, with the exception of some larger parcels and a number of vacant lots. Development within the City is less dense than in many suburban cities due to the lot size requirements for on-site septic systems. Residential and commercial development west of the Snoqualmie Valley Trail tends to be older, with some historic structures in the downtown area, while contemporary development is typical of suburban density and style. The Snoqualmie Valley is framed by wooded slopes to both the west and east; views to the east include the Cascade Mountains. Formerly an active farming community dominated by truck farming and dairy operations, Carnation has increasingly become a town center for a rural residential community (King County, 2004).

See Chapter 12 of the *Carnation Wastewater Treatment Facility Final EIS* (King County 2004) for more details aesthetics in Carnation.

l. Public Services and Utilities

Fire protection services are provided by Eastside Fire and Rescue, under an Interlocal Agreement between Fire Districts #10 and #38 and the Cities of Issaquah, North Bend, and Sammamish. Eastside Fire and Rescue covers an area of approximately 165 square miles with 12 fire stations. Eastside Fire and Rescue's Carnation station houses two fire engines, one aid car, and one rescue unit; operates seven days a week, 24 hours a day, and has an average response time of five to six minutes.

Since October 1, 2004, the City of Carnation has contracted with the City of Duvall to provide police service. The contract calls for three full-time equivalent officers and one half-time Chief of Police.

Education services are provided by the Riverview School District No. 407, which serves the City of Carnation as well as the lower Snoqualmie Valley area. Cedarcrest High School in Duvall serves Carnation students in grades 9 through 12, and Tolt Middle School serves Carnation students in grades 6 through 8. Carnation Elementary School serves the elementary school students of Carnation.

Solid waste collection, removal, and recycling services are provided by a Solid Waste Interlocal Agreement with King County, which allows the use of the Cedar Hills Landfill for solid waste disposal. Waste Management, Inc. provides removal service in accordance with the 1975 *King County Solid Waste Management Plan*.

The City of Carnation Public Works Department is responsible for daily operations of the City's potable water service. The City's primary water source is the springs that are situated in an 80-acre tract owned by the City and located in unincorporated King County, approximately 2.5 miles southeast of the city center. The springs currently have enough capacity to supply most of the City's daily water needs. Water from the springs feeds into the City's water storage reservoir and then flows by gravity to the City. The reservoir has a total volume of 238,200 gallons, which includes a standby storage of 164,000 gallons.

During peak water use periods, when flow from the springs is not adequate to meet demand and water levels in the reservoir fall below the standby storage volume, the well pump is activated. The well is located in Loutsis Park and has a rated capacity of 700 gallons per minute (gpm). No source of contamination is allowed to be constructed, stored, disposed of, or applied within the sanitary control (designated protection area) of either the springs or the well (City of Carnation, 1996).

Public wastewater collection, treatment, and disposal is currently not available within the City. Wastewater collection and treatment is done by individual on-site septic systems. Septic tank sludge from these systems is collected on-site by private companies and hauled off to designated wastewater treatment facilities.

Stormwater within the City and surrounding areas is collected by a series of open channels and roadside ditches, stormwater pipelines, wetlands, infiltration systems and a detention pond. These conveyances allow runoff to infiltrate into the ground. The City's downtown area runoff has a system of infiltration recharge chambers that control stormwater runoff.

Puget Sound Energy (PSE) provides electrical service to the City of Carnation. The City is currently supplied with enough electricity to satisfy demand for electrical power. A 115-kilovolt (kV) transmission line runs north-south through the City, adjacent to the Snoqualmie Valley Trail. The Tolt power substation is located at the intersection of Entwistle Street and the Snoqualmie Valley Trail (City of Carnation, 1997).

Natural and propane gas are provided by PSE. Approximately 263 of the City's residents receive gas from PSE. Some residents use propane gas from on-site tanks that are serviced by individual providers. PSE also provides electrical power within the City.

See Chapters 8 and 15 of the *Carnation Wastewater Treatment Facility Final EIS* (King County, 2004) for more details on energy and public services and utilities in Carnation.

m. Transportation

The transportation system in the City of Carnation and unincorporated King County that may be affected by this proposal is comprised of State Route (SR 203), minor arterials, and collector streets. SR 203 also Carnation's main street, Tolt Avenue, bisects what has been designated as

the downtown design district in the commercial area. Large volumes of traffic pass through the city on SR 203 (King County 2004).

Carnation has few traffic congestion problems when compared to other King County cities. According to the City Comprehensive Plan, the City's transportation needs are more related to design and safety issues than circulation and congestion issues. There are generally few sidewalks, except in newer subdivisions and along arterials. Street pavement width is narrow, requiring pedestrians and vehicular traffic to often travel within the same lanes. The City does provide street lighting. Based on Washington State Department of Transportation (WSDOT) average daily traffic volumes, the principal roadways in Carnation are well below capacity (Carnation, 1996).

n. Noise

The major noise sources within the project area include vehicular traffic, overhead air traffic, and light industrial activity (King County, 2004). Other noise sources include some manufacturing noises, yard and maintenance equipment, and sirens and horns from the Fire and Rescue Station.

See Chapter 10 of the *Carnation Wastewater Treatment Facility Final EIS* (King County 2004) for more details on noise in Carnation.

o. Cultural Resources

The project area is within the aboriginal territory of the Snoqualmie and Tolt Tribes. The *Technical Report for the Carnation Wastewater Treatment Facility Project EIS, Cultural Resources Overview* (Larson Anthropological Archaeological Services (LAAS), 2004) documents the presence of the historic, archaeologic, and ethnographic locations near the project area.

The *Carnation Wastewater Treatment Facility Final EIS* (King County, 2004) identifies the following historic properties and structures in the project area (see Table 2).

Table 2. Inventoried Historic Properties in the Carnation Vicinity

Historic Property or Structure	Address or Location	Listing Status
Andrew and Bergette Hjertoos Farm, 1907 (house), 1910 (barn)	31523 NE 40th Street	Washington Heritage Register and National Register
Dairy Farm Properties of the Snoqualmie River Valley (includes the Adair and Hjertoos Farms)	Multiple Property Submission, Snoqualmie River Valley	Washington Heritage Register and National Register
David and Martha Entwistle's House, 1912	32021 Entwistle Street	Washington Heritage Register, National Register, and Register of King County Landmarks
Independent Order of Odd Fellows Hall (Eagles Hall) No. 148, 1895	3940 Tolt Avenue	Washington Heritage Register, National Register, and Register of King County Landmarks

Historic Property or Structure	Address or Location	Listing Status
Stossel Bridge (Carnation Farm Road Bridge), 1951	NE Carnation Farm Road / Snoqualmie River crossing	Washington Heritage Register and Register of King County Landmarks
Commercial Hotel, 1913	31933 W. Rutherford Street	Register of King County Landmarks
Great Northern Boarding House, 1918	31619 Commercial Street	Not listed; local historical significance
William and Eugenia Lord House, 1911	Northeast corner of NE 40th Street and Tolt Avenue	Not listed; local historical significance
James and Sarah Davis House, 1900 (original); remodeled 1946 and 1986)	Southwest corner of King Street and Entwistle Street	Not listed; local historical significance
Tolt River Outfitters (originally Tolt State Bank), 1911	Southwest corner of Tolt Avenue and Entwistle Street	Not listed; local historical significance
St. Anthony Catholic Church, 1914	Southeast corner of E. Blanche Street and E. McKinley Street	Not listed; local historical significance
Snoqualmie Valley Trail-Tolt Trestle	Snoqualmie Valley Trail crossing of Tolt River	Not listed; local historical significance

Sources: Washington Office of Archaeology and Historic Preservation, 2003; King County, 2000; Tolt Historical Society, 1991; LAAS, 2004.

A professional archaeologist has conducted on-the-ground physical surveys, literature research, and evaluation of archaeological resources in the project area (BOAS, 2005). This research has identified both historic properties and probable sites of prehistoric resources. A map of areas of high probability of discovering cultural resources has also been developed. Artifacts were discovered during the surveys. The artifact findings are documented in a report submitted to the Washington State Office of Archaeology and Historic Preservation (BOAS, 2005). The City and King County are working directly with representatives of the U.S. Environmental Protection Agency, Washington State Office of Archaeology and Historic Preservation, and affected tribes to develop a Programmatic Agreement (PA) in compliance with Section 106 of the National Historic Preservation Act. The PA will address the process for investigation and final disposition of any artifacts discovered during construction.

No historic or culturally significant sites listed on federal, state, or local registers are located on or immediately adjacent to the treatment plant site. The nearest listed property is the Hjertoos Farm Site, located approximately 750 feet south. With the exception of the Stossel Bridge (Carnation Farm Road Bridge) at the river discharge, no historic or culturally significant sites listed on federal, state, or local registers are located on or immediately adjacent to the conveyance pipeline.

See Chapter 13 of the *Carnation Wastewater Treatment Facility Final EIS* (King County, 2004) for more details on cultural resources in the vicinity of the proposed treatment plant in Carnation.

2. UNIQUE AREAS

In accordance with the Council on Environmental Quality (CEQ) NEPA Regulations (40 CFR Parts 1500-1508), unique characteristics of the geographic areas such as proximity to historic and cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically sensitive areas are described in this EA. Historic and cultural resources and wetlands in the project area are described in the preceding sections. Unique park lands, prime farmlands, wild and scenic rivers, and ecologically sensitive areas are not present in the project area.

3. LAND USE AND POPULATION

a. Land Use

Land use within the Carnation city limits is predominantly residential, with commercial and small business areas, park and open space area, community facilities, and various vacant lots. Land use is governed by the Carnation Comprehensive Plan and the Carnation Municipal Zoning Code. The Zoning Code describes the possible land use, including density limits and requirements for impervious area, roads, and other factors related to development or redevelopment of land. Current land use includes 54 acres of commercial and industrial land, which is expected to grow within the City's downtown area. King County's 2002 buildable lands analysis reported if the City's zoning provides adequate capacity for its housing and job markets, Carnation's target residential capacity would be 246 additional units by the year 2022. This population growth is achievable only with the availability of sewer service. The City's Comprehensive Plan Update and amended land use code provide adequate capacity to meet the target population and employment increases. Land development (per the zoning code) is limited by the lack of wastewater service in many cases. It is expected that the centralized wastewater collection and treatment system would lead to development of parcels. Several parcels are inside the UGA but not incorporated into the city. The primary area likely to be developed as a result of sewer construction lies in the Potential Annexation Area (PAA) north of the City. This area consists of a combination of agriculture (berry farms and related agriculture) and residential development. A portion of the area in the north PAA lies within the 100-year floodplain of the Snoqualmie River. Currently, King County Code governs land use in this area. Only after a successful annexation would this land be governed by the City of Carnation. Currently, King County has jurisdiction over these parcels.

b. Population and Socio-Economic Conditions

The population of Carnation has remained fairly stable since its incorporation in 1912. The 1914-1915 King County Directory listed Carnation's population at 1,000. The 1980 Census credited Carnation with 951 residents, and the 1990 Census population was 1,243. By 1996 the City population was estimated at 1,540 residents. In 2000, the population was estimated to be 1,900 (King County, 2004). The City's population is expected to grow to 3,800 by 2022 (Carnation, 2004).

Carnation has a relatively young population (approximately 37 percent less than 20 years of age), with a median age of 32.1 years. One or more persons age 65 or older are living in 17.3 percent of Carnation households. Single person households comprise 26.4 percent of Carnation

households, and 5.4 percent are headed by females with no male present. Racial minorities make up 8.44 percent of the total population within the study area. County-wide, racial minorities are 26.59 percent of the total population (see the Environmental Justice below for more details). The City is also home to a small immigrant population. Carnation residents from other countries of origin than the United States, comprise 5.9 percent of the population.

The major employers in Carnation include the Riverview School District (education), Remlinger Farms (agriculture/retail), QFC Grocery Store (retail), Eldorado Stone (manufacturing), and Custom Concrete (manufacturing). At the time of the 1990 Census, there were 287 jobs in Carnation. Since there are far more households than jobs in Carnation, most Carnation residents commute to work outside the immediate area. Carnation has historically had one of the lower per capita incomes when compared to the surrounding cities of Duvall, Fall City, and Redmond. The 2000 Census reports median household incomes for King County and the City of Carnation of \$53,157 and \$60,156 respectively. At the time of the 2000 Census, 90.5 percent of Carnation area households had high school diplomas or a GED, while 30.5 percent had college degrees.

While over 50 percent of households are considered low to moderate income (household incomes less than 80 percent of the County median income), less than 6 percent of households fall below the poverty line (City of Carnation, 1997; U.S. Bureau of the Census, 2000). The 2000 Census revealed that 52.2 percent of the homes lying west of the Snoqualmie Valley Trail qualified as low to moderate income, while the residential areas east of the Snoqualmie Valley Trail did not fall into this category. The older areas of the City lie generally west of the Snoqualmie Valley Trail, while the newer developed areas lie generally east of the trail.

c. Environmental Justice Communities

Environment Justice communities include minority and low-income populations. Federal agencies are required to identify and address disproportionately high and adverse human health or environmental effects of proposed actions on minority and low-income populations. This requires identifying minority and low-income populations currently living in the project area, as well as identifying any social and economic characteristics of these populations that may cause the proposed action to result in disproportionately high and adverse effects on these populations. The following discussion is intended to provide the basis for public discussion and US EPA's review of the proposed City of Carnation Sewage Collection and Treatment System, pursuant to NEPA.

Definitions

Low-income population means any readily identifiable group of low-income persons who live in geographic proximity of the proposed project and, if circumstances warrant, geographically dispersed/ transient persons (such as migrant workers or Native Americans) who will be similarly affected by the proposed project, policy, or activity. For purposes of environmental justice analysis, low-income is defined as a median household income that falls below the U.S. Department of Health and Human Services (DHHS) poverty guidelines.¹

¹ Guidelines are updated periodically in the Federal Register by DHHS. The Census 2000 Summary File 3 contains sample data on population for whom poverty status is determined, based on these guidelines. Thresholds for

Minority Population means any readily identifiable group of minority persons (Black or African American, Hispanic or Latino, Asian, American Indian or Alaskan Native, Native Hawaiian or other Pacific Islander, or individuals identified as belonging to one other race or two or more races) who live in geographic proximity of the proposed project and, if circumstances warrant, geographically dispersed/transient persons (such as migrant workers or Native Americans) who will be similarly affected by a proposed program, policy or activity.

A *minority population* is considered to be present if the minority population percentage of the affected area is greater than the minority population percentage in the general population or other appropriate unit of geographic analysis (census tracts are generally considered appropriate). Guidance from the U.S. CEQ states that:

“Minority populations should be identified where either (a) the minority population of the affected area exceeds 50 percent or (b) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis” (CEQ, 1998).

Disproportionately High and Adverse Effect on Minority and Low-Income Populations means that an adverse effect is predominately borne by a minority population and/or a low-income population and that the effect will be suffered by the minority population and/or low-income population and is appreciably more severe or greater in magnitude than the adverse effect that will be suffered by the rest of the population. The Civil Rights Act ensures that this potential for discrimination is identified and addressed without regard to race, color, national origin, sex, age, or disability and includes the following adverse affects:

- destruction or disruptions of community cohesion (community separation);
- destruction or disruptions to access of available public and private facilities and services;
- adverse employment effects;
- displacement of businesses, housing, and people;
- tax and property value losses;
- actions injurious to the public’s health (e.g., air, noise and water pollution); and
- actions harmful to the public’s well being (e.g., aesthetic impacts and loss of recreational property).

Study Area

The location of minority and low-income populations potentially affected by the proposed project was identified through review of census data for the study area. For purposes of the

defining low income have changed since the Census 2000 data was compiled. However, updated data for household income are not available for the environmental justice analysis. Therefore, Census 2000 data were used, which compare household income in 1999 dollars to the DHHS guidelines in effect at that time.

environmental justice analysis, the study area is defined as the limits of potential construction activity and potential operational project impacts. It was reasoned that most of the environmental effects resulting from this project would be limited to the properties in the immediate vicinity, within approximately 0.5 miles of the project location. According to the U.S. Bureau of the Census 2000 geographic boundaries, the study area boundaries are located within Census Tract 325 and Census Tract 323.15. Census Tract 325, where the vacuum sewer system and treatment plant are located, constitutes the *impact area*. Detailed information about populations within the study area can be compared to the larger population. For purposes of this analysis, the larger population is considered to be the entire King County service area.

Minority Population

Table 3 identifies minority populations in the project study area and in the larger geographic area of King County. Approximately 8.44 percent of the total population in the study area is minority, which is lower than King County as a whole (26.59 percent) (U.S. Bureau of the Census, 2000). American Indian or Native Alaskan are the only minority group with a higher percentage in the project study area than in King County, though the difference is small.

Low-Income Population

Table 3 identifies low-income populations in the project study area and in the larger geographic area of King County. Approximately 4.54 percent of the total population in the study area is considered low-income according to DHHS poverty guidelines, which is lower than King County as a whole (8.21 %) (U.S. Bureau of the Census, 2000).

Table 3 Environmental Justice Populations in the Study Area and King County

Population ¹	CT 325		CT 323.15		Study Area (CT 325 and CT 323.15)		King County	
	Number	% of Total	Number	% of Total	Number	% of Total	Number	% of Total
Low-income ²	290	5.91	160	3.19	450	4.54	142,546	8.21
Black or African American	9	0.18	16	0.32	25	0.25	91,798	5.28
American Indian or Native Alaskan	66	1.35	14	0.28	80	0.81	14,278	0.82
Asian	97	1.94	170	3.39	267	2.69	186,615	10.74
Native Hawaiian or other Pacific Islander	4	0.08	3	0.06	7	0.07	8,737	0.50
Hispanic or Latino	128	2.61	95	1.90	223	2.25	95,242	5.48
Other	12	0.24	18	0.36	30	0.30	4,577	0.26
Two or more races	106	2.16	99	1.97	205	2.07	60,660	3.50
Total minority population	422	8.61	415	8.27	837	8.44	461,907	26.59
Total Population³	4,903		5,016		9,919		1,737,034	

¹ Source: Census 2000 Summary File 1, Tables P3 and P4 - 100-Percent Data - Race and Hispanic or Latino status.

² Source: Census 2000 Summary File 3 - Table P87 - Sample Data - Population for whom poverty status is determined.

³ Total population for race. Note, total population per Tract for "population for whom poverty status is determined" differs from total population for race in the city of Mukilteo (Total = 18,019). Source: Census 2000 Summary File 1, Tables P4 and P7 - 100-Percent Data - Race and Hispanic or Latino status.

Public Involvement

A public involvement process was conducted as a component of this proposal, including community meetings and periodic newsletters. The City of Carnation held several public open houses and coordinated with individual members of the community and community groups throughout the process. Efforts were designed to promote an understanding of the project, and to solicit early feedback to ensure that input was incorporated into the decision making process (refer to Chapter 6 for a summary of public involvement efforts).

CHAPTER 4. ENVIRONMENTAL EFFECTS ASSOCIATED WITH THE ALTERNATIVES

1. DIRECT ENVIRONMENTAL IMPACTS

This section describes the direct impacts of the proposed alternative on the environmental elements presented in Chapter 3. Impacts are described for project construction as well as for ongoing operation. Steps to minimize environmental impacts (e.g., mitigation measures) are discussed in Chapter 5.

a. Soils and Geology

Alternative 1 – No Action Alternative

Under the No Action Alternative, no project construction or associated impacts on earth resources would occur. Wastewater would continue to be discharged to the soil through on-site septic systems, resulting in less treatment than would be provided by the treatment plant. Properly functioning on-site septic systems would treat wastewater through soil filtration. Failing on-site septic systems would provide little treatment. Continued reliance on aging on-site septic systems could result in failures during seismic events.

Alternative 2 – Vacuum Sewer System and Wastewater Treatment Facility

Construction. The proposed action would generate short-term effects due to erosion during construction. Because the construction method would primarily be standard open-trench, topsoil and deeper soils would be temporarily stockpiled next to the trench while the pipes are being laid, then placed back into the trench for compaction and restoration. Some construction methods associated with the project may result in vibration and settlement that could damage adjacent structures or utilities. See Chapter 4 of the *Carnation Wastewater Treatment Facility Final EIS* (King County, 2004) for more details on impacts to soils and geology associated with the project.

Vacuum Sewer System. Construction of the vacuum sewer system for the City would include the installation of approximately 14,526 feet of 10-inch-diameter polyvinyl chloride (PVC) pipe, 8,946 feet of 8-inch-diameter PVC pipe, 8,610 feet of 6-inch-diameter PVC pipe vacuum sewer interceptor trunk lines, 22,835 feet of 4-inch-diameter PVC vacuum sewer collector pipe, and 5,100 feet of PVC force mains (1.5-inch, 2-inch, and 3-inch diameters). The project would also include one vacuum/pump station to pump the wastewater from the City's vacuum sewer system to King County's treatment plant. Open excavation-dry construction would be used to complete the pipe trench work. The PVC pipe would be placed in 4- to 6-foot-deep trenches within street rights-of-way and easements and in the King County Snoqualmie Valley Trail right-of-way. These trenches would be 18 inches to 30 inches wide. Widths of temporary construction impacts would likely vary from as little as 10 feet in some places to a more typical 15 feet in easement areas, to 50 feet wide or more in dedicated construction staging areas. Activities in the rights-of-way and easements would be limited to cutting pavement using a pavement saw, trenching with a small

backhoe or trackhoe, placing bedding material (gravel) using dump trucks and a front-end loader, and backfilling the trenches. Excavated material would be stockpiled next to the trench and used as backfill when the pipe is installed. Excavated material not used as backfill would be removed from the site in dump trucks and disposed at an appropriate upland location authorized by the City.

Wastewater Treatment Plant. The treatment plant site is currently mowed with the exception of a few patches of shrubs and trees. Approximately 3 acres of the 10-acre parcel would be disturbed by excavation and/or grading.

Discharge. The majority of the conveyance system from the treatment plant to the discharge location would be located within the road right-of-way. One short segment of the route is on private land, which would require an easement. The pipeline would be about 12 inches in diameter and be buried between 3 and 8 feet below the ground surface. The majority of the pipeline length would be constructed by performing open-cut excavations using a backhoe and a pipeline route excavation (trench) box.

The river outfall consists of discharging the highly treated water produced by the treatment plant into the Snoqualmie River at the Carnation Farm Road Bridge. The majority of outfall construction would occur from the bridge deck and is expected to take approximately three weeks to complete. No disruption of streambed materials is anticipated as a result of outfall construction. After construction, any shoreline areas disturbed during construction would be restored.

b. Air Quality

Alternative 1 – No Action Alternative

Under the No Action Alternative, no construction-related impacts to air quality would occur because no new treatment facility would be constructed. Properly functioning on-site septic systems can emit detectable odors, and as on-site septic systems age, the probability of system failure increases. This could increase the potential for odor impacts.

Alternative 2 – Vacuum Sewer System and Wastewater Treatment Facility

Construction. The proposed action would have temporary short-term effects on air quality due to exhaust from construction equipment and dust from ground disturbance. These effects would be temporary and localized.

Vacuum Sewer System. Alternative 2 would not affect air quality in the long term. Because the wastewater collection system would be under vacuum pressure, odors would not escape from the collection system. The vacuum/pump station would be the collection point for wastewater and therefore the most likely source of odors; however, there is a low probability of odors from this station.

Wastewater Treatment Facility. Odor-causing substances that commonly occur in wastewater consist of both organic and inorganic compounds. Because wastewater would be conveyed to, and then pumped from, a central location, there is a possibility of odors. The three areas within a treatment facility with the highest potential of producing detectable odors are the influent pump

station, headworks, and solids handling areas. Most odor-causing compounds form as a result of anaerobic decomposition of organic material containing sulfur and nitrogen. Odor emissions are most likely to occur during warm periods and at points of turbulence within the collection and treatment processes. The presence and direction of prevailing breezes and the proximity of homes or businesses to the treatment plant would influence the degree of impact, and impacts could vary as weather patterns change throughout the year. Minimal if any odor impacts to surrounding properties are expected during operation of the treatment plant due to the odor control measures described in Chapter 5 (King County, 2004).

c. Surface Water

Alternative 1 – No Action Alternative

The No Action Alternative would leave existing septic systems in place and in active use. These systems would continue to deliver an estimated 175,000 gallons or more of septic tank effluent per day to the underlying aquifer, with varying states of treatment prior to discharge. Risk to surface water quality would continue at present or increased levels as aging systems continued to fail.

Alternative 2 – Vacuum Sewer System and Wastewater Treatment Facility

Construction. Erosion will likely occur during construction of the vacuum sewer collection system and wastewater treatment plant and outfall. Temporary impacts to streams and surface water quality may occur with increases in turbidity; however, these are anticipated to be infrequent with the implementation of erosion control measures and construction best management practices.

Vacuum Sewer System. No long- or short-term negative impacts on streams or surface water quality are expected from the operation of the vacuum sewer collection system.

Wastewater Treatment Facility and Discharge. Operation of a treatment plant would result in the discharge of highly treated water to the Snoqualmie River. The membrane bioreactor (MBR) selected for the treatment plant is one of the best available technologies for treating municipal wastewater. The MBR would produce highly treated water. The quality of the water produced by the treatment plant would meet Washington State surface water quality standards. The outfall would discharge an average flow of about 400,000 gallons per day (gpd) or approximately 0.6 cubic feet per second (cfs), of highly treated water into the Snoqualmie River. This input is small compared to the relative Snoqualmie River flows. Based on 73 years of record, the average Snoqualmie River flow is 3,738 cfs and the minimum discharge is 239 cfs. The small amount of highly treated water would be entrained into the river current and diluted (King County, 2004). The potential impacts to water quality associated with wastewater discharge are generally related to temperature, bacteria and viruses, nutrients, turbidity, and chemical contamination. Each of these water quality parameters may be negatively impacted in the area around the mixing zone (within approximately 25 feet of the outfall) (King County, 2005). As described in the Biological Assessment (King County, 2005), the combination of expected low concentrations of pollutants in highly treated water from the treatment facility and rapid dilution when discharged to the Snoqualmie River is expected to result in no significant adverse change to ambient water quality

and quantity. The anticipated mixing zone for the discharge is small. It is anticipated that the required dilution would occur for most regulated constituents within approximately 25 feet of the discharge. Section 1.h of this Environmental Assessment discusses the effect of these water quality impacts on aquatic life. See Chapter 6 of the *Carnation Wastewater Treatment Facility Final EIS* (King County, 2004) for more details on impacts to water resources.

Alternative 2 is expected to have an overall positive impact on water quality resulting from removing all septic systems within the City from active use. Further details on water quality impacts associated with the project are found in the Biological Assessment (King County, 2005).

d. Floodplains

Alternative 1 – No Action Alternative

The No Action Alternative will not impact floodplains.

Alternative 2 – Vacuum Sewer System and Wastewater Treatment Facility

Vacuum Sewer System. The majority of the vacuum sewer collection system would consist of buried piping and appurtenances, which would not cause any change in the surface elevation of the ground in the project area and therefore have no effect on the floodplain. The vacuum sewer system would include a central vacuum/pump station, which would be constructed on the treatment plant site. Part of the vacuum/pump station site would be within a mapped 100-year floodplain. This building would be constructed in a manner consistent with the City of Carnation development regulations, which require a structure to be placed at a proper elevation and constructed of such materials so as to avoid or reduce flood impacts. These impacts are defined as damage to the infrastructure itself and damage to the environment stemming from failure of the building to contain the sewage collected and conveyed from within the building. Any portion of the central vacuum/pump station built in the 100-year floodplain would result in filling of an area and loss of flood storage capacity. Filling in the floodplain would also displace floodwaters and could cause flooding in other areas, including adjacent properties. Building in the floodplain also has the potential to constrict the area where water can flow. This can cause an increase in water velocities that could result in erosion problems. Site surveys are required to fully understand floodplain impacts.

Wastewater Treatment Facility. Construction and operation of the treatment plant could potentially impact floodplain areas. If any portion of the treatment plant were built in the 100-year floodplain, it could result in filling of an area and loss of flood storage capacity. The proposed location of the treatment plant is outside the current mapped floodplain. There is an ongoing flood study for the lower Snoqualmie River that could change the mapped floodplain boundary and affect whether the treatment plant is in or out of the Snoqualmie River 100-year floodplain. Filling in the floodplain would displace floodwaters and could cause flooding in other areas, including adjacent properties. Building in the floodplain could also constrict the area where water can flow. This can cause an increase in water velocities that could result in erosion problems. Site surveys are required to fully understand floodplain impacts. See Chapter 6 of the *Carnation Wastewater Treatment Facility Final EIS* (King County, 2004) for more details on impacts to the floodplain associated with the project.

e. Groundwater

Alternative 1 – No Action Alternative

The No Action Alternative would leave existing septic systems in place and in active use. These systems would continue to deliver an estimated 175,000 gallons or more of septic tank effluent per day to the underlying aquifer, with varying states of treatment prior to discharge. Risk to groundwater quality would continue at present or increased levels as aging systems continued to fail.

Alternative 2 – Vacuum Sewer System and Wastewater Treatment Facility

Diversion of groundwater may be needed during construction of the vacuum sewer system and the wastewater treatment plant. Current project construction plans for the wastewater treatment plant do not call for long term draw down of groundwater. And therefore is not anticipated that dewatering wells will be installed and groundwater pumped during construction so facilities can be built below the elevation of the normal groundwater table. Also, long term draw down of groundwater is not anticipated for construction of the small diameter of the conveyance pipe using traditional open trench construction. However, during most construction projects, it becomes necessary at some point to remove water from open excavation areas. So although long term dewatering is not anticipated, some dewatering might occur. Dewatering operations would comply with all appropriate discharge and treatment rules and regulations established by the Washington State Department of Ecology.

Operation of a centralized wastewater facility would likely improve groundwater quality by reducing and/or eliminating the introduction of poorly treated septage from inadequately functioning on-site sewage systems.

f. Vegetation

Alternative 1 – No Action Alternative

The No Action Alternative would have no effect on vegetation.

Alternative 2 – Vacuum Sewer System and Wastewater Treatment Facility

Vacuum Sewer System. Construction of the vacuum sewer collection system would have short-term effects on residential vegetation, primarily lawns and small shrubs. Alternative 2 calls for pipe locations to avoid disturbing large trees and well-developed areas, with a preference for pipeline placement in rights-of-way and in lawn and driveway areas where easements are required. Alternative 2 would remove only two ornamental trees in a residential easement area. The nature of a vacuum sewer system is such that pipes do not need to run in straight lines, as for a gravity sewer system. This provides flexibility to pass around trees and under roots to limit vegetation impacts.

Wastewater Treatment Facility and Discharge. Construction of the treatment plant would result in temporary and/or permanent disruption of vegetation. Temporary impacts include

disturbing areas during construction clearing and grading. Permanent impacts include displacement of vegetation at the treatment plant site. See Chapter 7 of the *Carnation Wastewater Treatment Facility Final EIS* (King County, 2004) for more details on impacts to vegetation associated with the project.

g. Wetlands

Alternative 1 – No Action Alternative

The No Action Alternative would have no effect on wetlands.

Alternative 2 – Vacuum Sewer System and Wastewater Treatment Facility

No wetlands have been identified in the construction areas of the vacuum sewer system, wastewater treatment plant, conveyance pipeline, or river discharge; therefore, the proposed action would have no construction or operation impacts on wetlands.

h. Fish and Wildlife

Alternative 1 – No Action Alternative

Continued reliance on on-site septic systems could lead to increased levels of nutrients, bacteria, and other pollutants reaching area surface waters as these systems age and become more susceptible to failure. The increased level of pollutants from on-site septic systems could adversely affect biological resources in the Snoqualmie Valley (King County, 2004).

Alternative 2 – Vacuum Sewer System and Wastewater Treatment Facility

Vacuum Sewer System. The majority of the vacuum sewer collection system would be constructed in public right-of-way. Disturbance to forested habitat of Loutsis Park and the forested corridor in the King County Snoqualmie Valley Trail Park are expected to be minimal. Therefore, impacts to fish and wildlife such as temporary wildlife habitat alteration or disruption resulting from noise, construction crews, increased vehicle traffic, and machinery; construction-generated erosion and sedimentation are expected to be minimal.

Wastewater Treatment Plant and Discharge. Construction of the treatment plant and conveyance line could result in temporary wildlife habitat alteration or disruption resulting from noise, construction crews, increased vehicle traffic, and machinery; construction-generated erosion and sedimentation; and accidental introduction of pollutants into the Snoqualmie River. Because of the relatively long distance between the treatment plant and effluent conveyance pipeline construction sites and the Snoqualmie River, increased turbidity that could affect fish in the river is not anticipated. Construction of the river discharge could potentially result in temporary habitat disruption and accidental introduction of pollutants into the Snoqualmie River. This could adversely affect fish and other aquatic organisms and waterfowl. With the measures that would be required as part of permitting for the project, these impacts would be eliminated or minimized.

Assuming that most of the western portion of the City-owned site would be left undisturbed, operation of a treatment plant on the site would result in the permanent loss of between 2.5 and 3

acres of upland grassland habitat. However, due to the low quality of habitat for native wildlife, the impact of habitat loss on local wildlife would not be significant.

Similar to the impacts described for construction of the treatment plant, potential construction impacts associated with conveyance pipelines include erosion and sedimentation, temporary habitat loss or fragmentation (e.g., vegetation clearing and grading), accidental and incidental discharge of pollutants, dewatering and discharge of dewatering water, and increased noise and lighting levels. Alternative 2 would result in the discharge of highly treated water directly into the Snoqualmie River. The quality of the discharge water would meet surface water quality standards and be further conditioned through the Washington State Department of Ecology permit, which is required for discharge of treated wastewater. The potential impacts to biological resources from the discharge of highly treated water are generally related to nutrients, metals, and temperature. Nutrients such as nitrogen and phosphorus, and metals including cadmium, lead, mercury, and copper, may be present in highly treated water at very low levels. Additionally, treated water may be warmer than the river water to which it is discharged (King County, 2004). See Chapters 6 and 7 of the *Carnation Wastewater Treatment Facility Final EIS* (King County, 2004) for more details on impacts to water quality and the fish and wildlife associated with the project. The project Biological Assessment also provides greater detail on this subject (King County, 2005).

i. **Threatened and Endangered Species**

Alternative 1 – No Action Alternative

Refer to the No Action Alternative discussion in “h” above regarding pollutants from septic systems impact on fish and wildlife.

Alternative 2 – Vacuum Sewer System and Wastewater Treatment Facility

As described in the Biological Assessment prepared for this project (King County, 2005), the project may impact Chinook salmon and bull trout in the Snoqualmie River. Construction of the effluent discharge pipeline will occur in proximity to the Snoqualmie River, primarily as it approaches the Carnation Farm Road Bridge. Sedimentation from construction could occur if not properly controlled on-site.

The new river outfall will discharge highly treated wastewater into the Snoqualmie River. The Carnation wastewater treatment plant will utilize MBR treatment technology and UV light disinfection. This represents the highest practical level of treatment technology; however, MBR technology does not remove all constituents from the effluent. Some of the constituents present in the treated wastewater are regulated and are known to have the potential to affect aquatic life.

The potential effects to water quality associated with wastewater discharge are generally related to temperature, bacteria and viruses, nutrients, turbidity, and chemical contamination. The new outfall will discharge an average flow of about 400,000 gallons per day (gpd), or approximately 0.6 cubic feet per second (cfs), of highly treated water into the Snoqualmie River. The maximum average monthly flow is anticipated to be 620,000 gpd, or approximately 0.96 cfs. This input is small compared to the Snoqualmie River flows. Based on 73 years of record, the average Snoqualmie River flow is 3,738 cfs and the minimum discharge is 239 cfs.

As part of the Biological Assessment prepared for this project (King County, 2005), King County modeled dilution of the discharge based on an assumption of a maximum discharge to the river of 620,000 gpd and a 7Q10 river flow rate of 443 cfs. (The 7Q10 refers to the lowest consecutive 7-day streamflow that is likely to occur in a 10-year period. It is commonly used by in setting discharge limits in National Pollutant Discharge Elimination System [NPDES] water quality permits.) This analysis method provides a conservative and precautionary approach to determining dilution rates since the maximum discharge rate is most likely to occur during winter months while the 7Q10 river flow rate is expected to occur in the summer months (King County, 2005; Appendix D).

As described in the Biological Assessment (King County, 2005), the combination of expected low concentrations of pollutants in highly treated water from the Carnation Wastewater Treatment Facility and rapid dilution when discharged to the Snoqualmie River is expected to result in no significant adverse change to ambient water quality and quantity. The anticipated mixing zone for the discharge is small. It is anticipated that the required dilution would occur for most regulated constituents within approximately 25 feet of the discharge.

The relatively small size of the acute mixing zone compared with the overall volume of the Snoqualmie River would minimize the potential for adverse impacts to biological resources from elevated temperature. In summary, the presence of nutrients, metals, or elevated temperatures resulting from the new outfall is not expected to result in significant adverse effects to listed fish and wildlife species. The quality of the discharge water would meet surface water quality standards.

j. Recreation Resources

Alternative 1 – No Action Alternative

Under the No Action Alternative, no impacts on recreational resources would occur. Continued reliance on individual on-site septic systems could lead to diminished water quality in the area with increased failure of aging septic systems, which could result in decreased use of water-related recreational resources.

Alternative 2 – Vacuum Sewer System and Wastewater Treatment Facility

Vacuum Sewer System. Pedestrian and other non-motorized traffic on the Snoqualmie Valley Trail would be affected during construction of the portions of the vacuum sewer collection system. The contractor would be required to ensure that the trail remains open, including the possibility that construction operations might have to be modified to allow continued use of the trail. Some limited delays in trail operation (up to several hours) may be required for safe completion of critical tasks, such as lateral cuts for the trail surface. Other temporary indirect construction impacts during vacuum sewer system construction include increased noise, dust, and light and glare.

Wastewater Treatment Facility and Discharge. Users of nearby recreational facilities could be subject to temporary indirect impacts during wastewater treatment facility construction, such as increased noise, dust, and light and glare. Traffic congestion and construction vehicle traffic could affect local travel to park and recreational features near the treatment plant site, but

because of the localized and short-term nature of the construction activity, impacts are expected to be minimal.

No operational impacts to nearby recreational facilities are anticipated after the vacuum sewer collection system and wastewater treatment facility are constructed. See Chapter 11 of the *Carnation Wastewater Treatment Facility Final EIS* (King County, 2004) for more details on impacts to recreation with the project.

k. Visual Aesthetics

Alternative 1 – No Action Alternative

With the No Action Alternative, visual and aesthetic conditions in the area would be expected to remain unchanged.

Alternative 2 – Vacuum Sewer System and Wastewater Treatment Facility

Vacuum Sewer System. Temporary impacts to visual aesthetics would occur during construction due to the presence of heavy equipment and materials. Following completion of construction, all vacuum sewer lines will be buried. The vacuum/pump station will be housed on the treatment plant site, and impacts would be similar to those described below.

Wastewater Treatment Facility. Typical construction impacts would include the presence of construction equipment on the street and at the site, materials stockpiled in various locations on the site, and worker vehicles. These impacts would be temporary.

Aesthetic impacts associated with the operation of the treatment plant would include the conversion of a site that is largely a vacant field to new buildings and site development typical of a small light-industrial facility. Views from adjacent residential properties and Tolt MacDonald Park would change from open field to territorial views of new buildings until the vegetative screenings around the site matures.

l. Public Services and Utilities

Alternative 1 – No Action Alternative

The No Action Alternative is not expected to have a significant impact on existing public services. The existing service providers appear to have adequate capacity to meet near-term demands. Some public service providers could find it difficult to add on to their facilities because of current Seattle-King County Department of Public Health regulations for expansion or new construction of on-site septic systems.

The City of Carnation would continue to rely on on-site wastewater disposal in the absence of a wastewater utility. The impacts of reliance on on-site wastewater disposal include potential threats to water quality and limits on development.

Alternative 2 – Vacuum Sewer System and Wastewater Treatment Facility

Construction. During construction, no significant impacts to law enforcement, fire, and emergency service response times are expected from roadway disruptions. Emergency service response times could be affected by increased traffic along nearby roadways during construction. However, traffic control measures including implementation of a city-approved traffic control plan and notification to emergency service providers of street blockages could be used to minimize impacts to emergency service vehicles.

Minimal impacts to utility services are anticipated during construction of the treatment plant. Construction impacts to utilities typically relate to the need to relocate a utility or temporarily disrupt utility service. Extension of water, electric, and communication services to the treatment plant site would be required, but these activities are typical of the operations of utility providers.

Operation. Operational impacts to public service providers are not anticipated.

No significant adverse impacts to energy resources are anticipated for operation of the proposed treatment system. The proposed facilities would have an annual electrical energy consumption of 150 megawatt hours (MWh), the average amount of electrical energy used by 12 single-family homes. The treatment facility would increase the electrical demand in the City of Carnation but would not exceed the current capacity of the Tolt Substation. Currently, the substation has the capability to provide 20 MVA (units of electrical demand) and can be upgraded to 25 MVA. The current load on the substation from Carnation and the surrounding area is approximately 10 MVA. The treatment facilities would increase the electrical demand by less than 1 MVA.

National Pollutant Discharge Elimination System (NPDES) discharge permits require alternative power sources, a standby generator, or additional storage capacity to prevent the release of untreated wastes during a power failure. A standby diesel generator would be located indoors at the treatment plant to provide sufficient power in the event the electrical feed was not available.

m. Transportation

Alternative 1 – No Action Alternative

The No Action Alternative would result in no changes to the existing transportation system. As a result, no adverse transportation impacts would be expected.

Alternative 2 – Vacuum Sewer System and Wastewater Treatment Facility

Construction. During the construction period, about 3,500 one-way vehicle trips are expected to enter and exit the King County wastewater treatment facility construction site. Additional truck traffic associated with construction of the vacuum sewer system is expected throughout the city. The portion of the King County discharge conveyance pipe that extends out of the City of Carnation will add minor truck traffic to unincorporated King County roads. Throughout the project area construction traffic could cause temporary traffic congestion on some streets. At times street closures may be necessary.

Construction impacts could be minimized by routing construction traffic to major streets to the extent practicable, providing safety controls for traffic at construction locations, and restoring

street and trail site conditions after construction. Standard construction best management practices and compliance with permit conditions could also be implemented.

Operation. After construction, no long-term adverse transportation impacts are anticipated. The approximately 10 to 16 one-way truck and auto trips per week anticipated for wastewater treatment facility operation would not have an appreciable effect on the existing traffic patterns.

n. Noise

Alternative 1 – No Action Alternative

The No Action Alternative would generate no noise.

Alternative 2 – Vacuum Sewer System and Wastewater Treatment Facility

Construction. Engine noise from construction equipment would result in temporary, short-term effects on noise in the project area. These effects would be temporary and localized.

Vacuum Sewer System. There would be no long-term noise impacts resulting from Alternative 2. The vacuum station would be the collection point for wastewater and the most likely source of noise. Typical noise from the operation of the vacuum station include pumps and fans. Field visits to similar systems during operating hours revealed that a person standing outside the building cannot tell the vacuum pumps are running.

Wastewater Treatment Facility. The following types of noise are typically associated with treatment facility operation:

- Noise from the operation of mechanical equipment, including pumps, blowers, fans, mixers, and generators
- Noise from standby electrical generation equipment (e.g., backup generators for treatment facilities during a power outage)
- Noise from truck traffic, including deliveries and the transport of solids, grit, or screenings

No significant noise impacts from facility operations are anticipated. Equipment that generates substantial levels of noise at the treatment plant could be enclosed or shrouded in sound-attenuation structures.

o. Cultural Resources

Alternative 1 – No Action Alternative

No impacts to cultural and historic resources would result from the No Action Alternative because no construction or ground-disturbing activities associated with the proposed project would occur.

Alternative 2 – Vacuum Sewer System and Wastewater Treatment Facility

Vacuum Sewer System. The construction of the proposed vacuum sewer system would require a city-wide network of trenches and excavations ranging in depth from 4 to over 12 feet deep. The comprehensive and wide-ranging nature of this project increases the likelihood of encountering historic and cultural resources. Construction could affect unrecorded archaeological sites along the collection system routes. Excavation in previously disturbed areas would not likely have impacts to historic and cultural resources.

Wastewater Treatment Facility. Similar to construction of the vacuum sewer system, constructing the wastewater treatment facility, conveyance pipeline, and discharge has the potential to disturb or destroy historic and cultural resources, particularly in undisturbed areas.

Construction of the proposed project is not expected to have any effects on those structures that are protected by their historical registration status.

To minimize the potential for impacts to unrecorded cultural resources, a professional archaeologist could be retained prior to construction to conduct additional research and site-specific investigations in areas with high probability for archaeological resources. Should evidence of cultural resources be found, a data recovery plan could be developed. The plan could be prepared by a professional archaeologist, with input from Cultural Resources agencies and the Snoqualmie and Tulalip Tribes, focusing on treatment of archaeological deposits. Additionally, a monitoring plan could be developed prior to construction that would include a review of construction techniques and establish monitoring procedures, techniques, protocols, and reporting requirements (King County 2004).

p. Land Use

Alternative 1 – No Action Alternative

The No Action Alternative would not meet Carnation Comprehensive Plan Goals and Policies for managing growth in compliance with the GMA. New development on vacant land within the city limits and in potential annexation areas would be required to use on-site septic systems, requiring a large land area. Densities required in urban areas under the GMA would not be achievable. The currently developed areas of the City already face serious land development restrictions due to Seattle-King County Public Health codes for on-site wastewater treatment. These requirements would continue to restrict redevelopment and new development in the downtown area. Public health requirements would likely necessitate the City and Public Health to continue limiting development and possibly imposing a moratorium on all new development. The ability of the City to meet its density targets and provide urban levels of service would be severely hampered (King County, 2004).

Alternative 2 – Vacuum Sewer System and Wastewater Treatment Facility

The establishment of a sewer collection system and treatment service could allow the Carnation Comprehensive Plan to be more fully implemented, potentially resulting in an increase in new construction and changes in existing land use (King County, 2004). The City's Comprehensive Plan (2004) projects a population growth from a current population of 1,906 people to 3,442

people in 2022. Vacant parcels of commercial and residential land inside the City and within the UGA could be developed if sewer service becomes available. This would increase population in a manner that would be consistent with the City's Comprehensive Plan and the GMA.

To determine how much area could potentially be developed following the implementation of a centralized wastewater system, King County conducted a land cover analysis for the wastewater service area (urban growth area boundary) (King County, 2005). Existing land use (2002) was compared with zoning (see Figures 7 and 8). As shown in Table 4, based on this analysis an estimated increase of effective impervious surface area of 105 acres is expected when the City fully implements the zoning. Implementing the zoning is also expected to decrease the forest area and grass area by 43 and 63 acres, respectively.

Table 4. Summary of Change in Effective Impervious Area, Forest Area, and Grass Area

Land Cover	Existing Land Use	Proposed Zoning	Area Change	Percentage Change
Effective Impervious Area	155.40	260.73	105.32	68%
Forest Area	90.77	48.11	-42.66	-47%
Grass Area	561.22	498.46	-62.75	-11%

q. Population and Socio-Economics

Alternative 1 – No Action Alternative

The No Action Alternative would not incur the expense of the centralized sewer system from residences and businesses. Under the No Action Alternative, a decline in residential growth would continue; existing residences cannot currently expand or upgrade their homes and in the event of septic failure, some residents might not be able to stay in their homes. This alternative would also contribute to the decline of business development within the City and contribute to the financial hardship of the City.

Alternative 2 – Vacuum Sewer System and Wastewater Treatment Facility

As part of the construction of a city-wide sewer collection and treatment system, the City Council would require all businesses, homes, schools, and other institutions to connect to the system. When this document was prepared, the monthly total charge for the system was estimated at \$155 per month per residential connection. This monthly financial commitment, which would be required, would pose a financial hardship on many Carnation residents, with the hardship being felt more acutely by low to moderate income households. The centralized sewer system would allow many residents faced with septic system restrictions on property development to remain in their homes or expand them and could attract business and commerce to the City, which would help improve the City's economic standing.

r. Environmental Justice Communities

Alternative 1 – No Action Alternative

With no centralized sewer system under the No Action Alternative, residences and businesses in the City would continue to not be billed for such a system. Under the No Action Alternative residences and businesses in the City of Carnation would continue to rely on on-site septic systems for treatment and disposal of wastewater. The costs of maintaining and, where possible, repairing septic systems would continue to be paid by Carnation residents and business owners. These costs may adversely affect low-income people, including low-income minorities and other environmental justice communities. If septic restrictions were to cause businesses to close or residents to relocate, business failures and associated unemployment, and economic hardships could occur. These types of effects may be exacerbated for low-income communities and minority communities due to a reduced ability to relocate, to travel long distances to find alternative means of employment, or to attract new commerce.

Alternative 2 – Vacuum Sewer System and Wastewater Treatment Facility

The proposed action would replace existing private on-site septic systems, which would result in a new utility bill for all the citizens of Carnation served by the system. The new utility fees could adversely affect low-income populations and other environmental justice communities.

Based on the demographic information and the analysis of impacts, the populations affected by the project are expected to be predominantly non-minority and non-low-income. The proportions of low-income and minority populations in the project study area are generally lower than King County as a whole. The identified adverse effects of the proposed project on minority populations will not be appreciably more severe or greater in magnitude than those effecting non-minority populations. The identified adverse effects of the proposed project on low-income populations will be appreciably more severe or greater in magnitude than those effecting moderate or high-income populations due to the estimated monthly total charge for the system of \$155 per month per residential connection. Indirect effects of the new facility, such as higher property values, could also have an adverse effect on low-income populations, though the likely increase in total availability of low income housing stock as a result of allowable higher density would likely partially compensate for this impact.

As described in Chapter 1, the project would eliminate the public health and environmental threats from failed and inadequate on-site septic systems, which would accrue benefits to the general public, including minority and low-income populations. Additionally, no appreciable impacts to local businesses, including those where minority and/or low-income persons may be employed, are expected. It is expected the new facility will benefit local businesses and create more opportunities for business expansion and employment.

2. FINANCING THE PROJECT

Grant and loan funding for the City of Carnation portion of the proposed project (vacuum sewer collection system) would come from a variety of sources. The City has obtained federal, state, and Tribal assistance grants (STAG) and a Community Development Block Grant through King

County. The City has also obtained low-interest loans from the Public Works Trust Fund for both pre-construction and construction activities.

It is also anticipated that the King County portion of the project (wastewater treatment facility and discharge) would be partially funded through a low-interest loan from the Public Works Trust Fund.

All costs not covered by grant funding would eventually be paid by Carnation residents. The City continues to pursue grant funding to reduce the estimated monthly cost for its customers.

3. INDIRECT AND CUMULATIVE ENVIRONMENTAL IMPACTS

This section describes the indirect and cumulative environmental impacts of the preferred alternative (Alternative 2), a vacuum sewer system and wastewater treatment facility. An indirect effect is caused by the action and occurs later in time or farther removed in distance, but is still reasonably foreseeable. Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density, or growth rate, and related effects on air and water and other natural systems, including ecosystems (40 C.F.R. 1508.8(b)). If a causal relationship exists between a federal action and future private, local, or state development, then under the National Environmental Policy Act (NEPA) the development's environmental impacts should be discussed as an indirect effect of the underlying federal action (40 C.F.R. 1508.8).

A cumulative impact on the environment is one which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions (40 C.F.R. 1508.7). If there is no causal relationship between the development and the federal action under consideration, the impacts of future private, local, or state development are properly analyzed as cumulative effects (40 C.F.R. §1508.7). As explained below, there is a causal relationship between Carnation's state GMA-mandated comprehensive land use plan and future development. There is not a causal relationship between the proposed action and future development. Therefore, the impacts of future growth and development are properly analyzed as cumulative effects rather than indirect effects of the action.

a. Indirect Effects

Impervious Surface and Land Cover Alterations Associated with the Vacuum Sewer Collection System, Wastewater Treatment Plant, Effluent Conveyance, and Outfall

It is unlikely that the small amount of additional impervious surface from construction of the wastewater treatment plant and outfall would result in any measurable indirect effects. The proposed treatment plant footprint represents a very small portion of the watershed, and King County Wastewater Treatment Division proposes to provide stormwater detention and water quality treatment for all new impervious surfaces on the treatment plant site. Under current conditions, the City of Carnation stormwater runoff is regulated by Carnation Municipal Code

(CMC) 15.64 and the Washington State Department of Ecology's *Stormwater Management Manual for Western Washington*, as described in the *City of Carnation Stormwater Comprehensive Plan* (City of Carnation, 2003). The proposed facility would be in compliance with the regulations set forth in these documents. As described above, it is anticipated that an increase of 105 acres of effective impervious area would occur when the City's proposed zoning is fully implemented (see Figure 8).

Air Quality

Indirect air quality impacts from the proposed project are anticipated to be negligible. It is unlikely that the small amount of additional air and odor emissions from construction of the wastewater treatment plant and outfall would result in measurable indirect effects. No new emissions or odor sources would occur as a result of construction of the vacuum sewer collection system or effluent conveyance pipeline.

b. Cumulative Effects

Growth and Development

Development in the City is currently limited, in part, by a lack of wastewater service. The sewer system and wastewater treatment facility would accommodate the planned additional growth in the UGA as designated in the Carnation Comprehensive Plan. Some of this development could occur in areas mapped as being in the 100-year floodplain by the Federal Emergency Management Agency (FEMA). The sewer system and wastewater treatment facility would not directly cause this growth. The City's earlier choices and decisions, as reflected in its GMA-mandated comprehensive plan, would be the primary source or cause of this future growth and development. There is a direct causal relationship between land use planning and the impacts of future development (See, for example, *City of Carmel-by-the-Sea v. U.S. Dep't of Transportation*, 123 F.3d 1142, 1162-63 (9th Cir. Cal. 1997); *Laguna Greenbelt, Inc. v. U.S. Dep't of Transportation*, 42 F.3d 517, 525 (9th Cir. Cal. 1994)).

Furthermore, a level of growth could occur in Carnation regardless of the availability of a sewer system and wastewater treatment facility. On-site wastewater treatment, using septic tanks and drain fields, is a treatment option for some areas of the City. The proposed sewer system and wastewater treatment facility would accommodate Carnation's additional, intended development in the city by alleviating the need for septic system drain fields. This additional intended development would represent an incremental increase over the level of development that could occur even without the wastewater treatment system. Elements of the environment that may be impacted by planned growth and development are described below.

Stormwater. One of the most foreseeable and proximate effects of growth are the potential increases in impervious surfaces from new roofs, driveways, and parking areas at developed or redeveloped parcels and land cover changes that result in stormwater runoff from development. A Land Cover Analysis for the City of Carnation UGA was conducted as part of the Biological Assessment (King County, 2005) to assess the potential effect of locally planned growth as expressed by the total amount of anticipated impervious surface (change in effective impervious area [EIA]) and the effect of locally planned growth as expressed by the total reduction of forest and grass cover types. The results of this assessment are summarized above in Table 6. Refer to

the Biological Assessment and Essential Fish Habitat Assessment for the Wastewater Treatment Facility and Outfall (King County, 2005) for more details.

Transportation. Additional traffic will be generated by the planned growth in Carnation. This additional traffic has the potential to cause congestion problems.

Air Quality. There is a potential for air quality impacts associated with planned industrial and commercial development in Carnation including higher emissions of some air pollutants.

Cultural Resources. Older buildings could potentially be removed to make room for planned residential or commercial development.

Water Quality

When constructed, the Carnation vacuum sewer system and wastewater treatment facility would be one of a number of wastewater treatment plants that discharge into the Snoqualmie River. All of these plants are required to comply with the federal Clean Water Act, Washington State Water Quality Standards, and National Pollution Discharge Elimination System permit requirements. Although all these treatment plants discharge wastewater that has undergone a minimum of secondary treatment and must meet federal and state discharge criteria, there is a potential cumulative impact of lowered water quality in the Snoqualmie River. Refer to the Biological Assessment (King County, 2005) for a detailed analysis of these potential impacts.

4. COMPLIANCE WITH ENVIRONMENTAL LAWS AND EXECUTIVE ORDERS

a. Clean Water Act

The proposed action is consistent with the federal Clean Water Act. The purpose of the vacuum sewer system and wastewater treatment facility is to ultimately improve and protect water resources in the project area. Construction and operation of the proposed improvements will comply with NPDES construction general permit and wastewater discharge permit requirements.

b. Safe Drinking Water Act

The proposed project would improve water quality by eliminating the effluent discharge that in part currently migrates from failing septic systems into the City's aquifer.

c. Clean Air Act

The proposed Carnation vacuum sewer system and wastewater treatment facility will conform with applicable requirements of the Clean Air Act. In Washington State the Clean Air Act is implemented through the air quality regulations for Washington State (WAC 173-400 through 173-492) and regulations of specific sector agencies and regional air quality agencies charged with air quality regulation. In the Puget Sound region, the Puget Sound Clean Air Agency (PSCAA) has jurisdiction over air emissions in the Puget Sound region. The agency's primary concern with sewer and wastewater treatment facilities is from odor generation. The agency has approval authority over construction, erection, installation, alteration, reconstruction, or relocation of any stationary or portable device capable of releasing contaminants in the

atmosphere. Odor control design of the new and converted treatment plant facilities will comply with PSCAA requirements.

d. Historic, Architectural, Archaeological, and Cultural Sites (National Historic Preservation Act and Executive Order 11593).

No impacts are anticipated on known historic, architectural, archaeological, or cultural sites. Investigation for potential cultural resources will be carried out for the proposed action prior to beginning construction. Construction monitoring may be conducted. It is anticipated that a Programmatic Agreement under Section 106 of the National Historic Preservation Act will be completed in order to ensure proper protections are in place for Historic, Architectural, Archaeological, and Cultural Sites.

e. Wetlands

There are no wetlands impacts associated with the project; therefore; no protection requirements are anticipated.

f. Floodplain Management Executive Order 11988

Executive Order 11988, entitled “Floodplain Management” and dated May 24, 1977 (42 F. R. 26971), requires federal agencies to evaluate the potential effects of actions those agencies may take in floodplains in order to avoid adversely impacting floodplains wherever possible, and to ensure that their planning programs and budget requests reflect consideration of flood hazards and floodplain management. The intent of the Executive Order is that, wherever possible, federal agencies will implement the floodplains requirements through existing procedures.

The Environmental Protection Agency (EPA) provided a grant to the City of Carnation to build its wastewater conveyance system. E.O. 11988 applies to this project through the EPA grant. EPA has adopted regulations regarding the implementation of E.O. 11988. See 40 C.F.R. §6.302(b); Appendix A to 40 C.F.R. Part 6. Pursuant to those regulations, EPA determines whether a proposed action will be located in or will affect a floodplain. If so, the responsible official shall prepare a floodplain/wetlands assessment. The assessment will become part of the environmental assessment (EA) or the environmental impact statement. The responsible official shall either avoid adverse impacts or minimize them if no practicable alternative exists.

Chapter 4 of this Environmental Assessment and the Biological Assessment for the Carnation vacuum sewer collection system and wastewater treatment facility provide a comprehensive review and analysis of the proposed project’s potential impacts on the floodplains in the project area. Chapter 2 of this Environmental Assessment explains why there are no practicable alternatives to the proposed action, and Chapter 5 describes actions that will be taken to minimize the project’s adverse impacts on the project area floodplains. Together, this document and the Biological Assessment describe how this project meets the requirements imposed upon EPA by E.O. 11988.

g. Farmland Protection Act

It is EPA policy under the Farmland Protection Policy Act (PL 97-98) to protect agricultural lands from “irreversible loss as an environmental or essential food production resource.” The proposed project is not expected to have any impacts on nearby agricultural lands in the Rural Area. The land within the City limits and the Potential Annexation Area (PAA), which is all designated Urban and planned for full urban services, including wastewater services, is expected to convert to non-agricultural uses. This conversion is in accordance with existing city, county and state policies and laws.

h. Coastal Zone Management Act (CZMA)

King County is a coastal zone county. The Coastal Zone Management Act requires that all federal activities be consistent with approved state coastal zone management programs to the maximum extent possible. This project is located in a coastal zone county and appears to be consistent with Washington's Coastal Zone Management Program and policies. The project will be near both the Snoqualmie and Tolt Rivers. The CZMA, as it relates to the Washington State Shoreline Management Program, applies to actions located within 100 feet of a 100 year floodplain. A Coastal Zone Certification of Consistency must be submitted to the Department of Ecology for the proposed action.

i. Wild and Scenic Rivers

The proposed project is not located in the vicinity of any designated wild and scenic rivers.

j. Protection of Children from Environmental Risks

Federal activities must not cause undue environmental risks to children. Many studies have shown that children are significantly more susceptible to pollution and environmental contamination than adults. The purpose of this project is to provide conveyance and treatment of wastewater, thereby reducing a public health hazard. This action contributes to protecting children from environmental risks associated with contaminated surface and ground waters.

Tolt MacDonald Park, a public park adjacent to the proposed treatment plant, is used by children. Also, collection system improvements may place construction near residences and commercial areas. During construction, standard safety procedures will be implemented to minimize construction risk to local residents, visitors, and children, such as fencing along the construction site frontage on the road for the treatment plant site, use of warning signs around open trenches along the vacuum sewer and effluent conveyance pipeline route, traffic control plans and measures and minimization of trenches left open at the end of the day. Trenches temporarily excavated during construction will be backfilled. With such measures the construction activity should not cause undue environmental risks to children. During operation of the wastewater treatment plant, security will be provided in the form of fencing.

k. Environmental Justice Executive Order 12898

Executive Order 12898 is titled “Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations.” Each federal agency is required to achieve environmental justice by identifying and addressing disproportionately high and adverse human

health or environmental effects of its program, policies and activities on minority and low-income populations.

The proposed project could have an adverse effect on low-income populations due to new monthly utility costs. Indirect effects of the new facility, such as higher property values, could also have an adverse effect on low-income populations, though the likely increase in total availability of low income housing stock as a result of allowable higher density would likely partially compensate for this impact. As described in Chapter 1, the project would eliminate the public health and environmental threats from failed and inadequate on-site septic systems and contribute to business expansion and employment, which would benefit the general public, including minority and low-income populations.

I. Government to Government Coordination and Consultation, Including Indian Tribal Governments

Under the May 14, 1998, Executive Order 13084, entitled “Consultation and Coordination with Indian Tribal Governments,” federal agencies are required to coordinate all major policies, programs and activities with local Native American tribes on a government-to-government basis. In accordance with this policy, King County and/or its representative have made the following contacts:

m. Threatened and Endangered Species Protection (Endangered Species Act)

The following species are listed as threatened under the Endangered Species Act (ESA): Chinook salmon, Bald eagle, Bull trout, Canada lynx, Gray wolf, Grizzly bear, Marbled murrelet, Northern spotted owl, Marsh sandwort, and Golden paintbrush. As described in the Biological Assessment prepared for this project (King Count, 2005), the project “may affect” and is “likely to adversely affect” Chinook salmon and bull trout.

Construction of the effluent discharge pipeline will occur in proximity to the Snoqualmie River, primarily as it approaches the Carnation Farm Road Bridge. Sedimentation from construction could occur if not properly controlled on-site. The last section of the pipeline and the discharge diffuser will be constructed on the bridge and a support pier. Construction will involve no excavation or disturbance of the bed or banks of the river.

The new river outfall will discharge highly treated wastewater into the Snoqualmie River. The Carnation wastewater treatment plant will utilize MBR treatment technology and UV light disinfection. This represents the highest practical level of treatment technology; however, MBR technology does not remove all constituents from the effluent. Some of the constituents present in the treated wastewater are regulated and are known to have the potential to affect aquatic life. The potential effects to water quality associated with wastewater discharge are generally related to temperature, bacteria and viruses, nutrients, turbidity, and chemical contamination. As described in the Biological Assessment (King County, 2005), the combination of expected low concentrations of pollutants in highly treated water from the treatment facility and rapid dilution when discharged to the Snoqualmie River is expected to result in no significant adverse change to ambient water quality and quantity. The anticipated mixing zone for the discharge is small. It

is anticipated that the required dilution would occur for most regulated constituents within approximately 25 feet of the discharge.

The proposed action will not result in the removal or clearing of riparian vegetation and the action will not result in adverse modification to Chinook salmon spawning, rearing, or migratory habitats within Unit 8 of the Puget Sound Chinook ESU designated Critical Habitat or proposed Critical Habitat for the Coastal/Puget Sound DPS bull trout.

The Biological Assessment found that the project “may affect, and is not likely to adversely affect” the remaining species.

5. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Environmental resources that could be committed during construction and the life of the project include energy expended to construct and operate the system and future use of the vacuum station site for uses other than system operation. The collection and conveyance system along with the County's wastewater treatment facility would require dedicated land and energy.

6. SHORT-TERM USE OF THE ENVIRONMENT VS. MAINTENANCE OF LONG TERM PRODUCTIVITY

During construction of the proposed project, there would be a temporary disruption of traffic and increase in noise and dust, which would cause temporary inconvenience to local residents, visitors, and animal life.

Currently the public and environmental health within the City is at risk from inadequate sewage disposal systems and seepage of untreated sewer into groundwater aquifers from failing septic tanks.

The addition of a sewer system to the City would address the public health hazards identified by Seattle-King County Public Health and, by eliminating the on-site sewer disposal facilities, would provide long-term benefits to public health and safety.

The introduction of untreated sewage into the groundwater aquifer, as noted above in the Public Health letter (Kleeberg, 1988), also poses an environmental threat to the Tolt and Snoqualmie Rivers, which are adjacent to the City. These threats include introduction of nutrients, organic material, and bacterial contamination. The centralized wastewater collection and treatment system would eliminate the environmental threat of contamination to these rivers and aquifer from failed and inadequate on-site disposal systems and would, as a result, improve environmental health.

CHAPTER 5.

STEPS TO MINIMIZE ENVIRONMENTAL IMPACTS

1. MITIGATION MEASURES

The following mitigation measures are proposed by City of Carnation and King County to help ensure that the proposed project minimizes adverse effects on the environment. All of these measures were previously identified in the *Carnation Wastewater Treatment Facility Final EIS* (King County, 2004), and the *Biological Assessment and Essential Fish Habitat Assessment* (King County, 2005). The proposed measures would be designed and coordinated by design and construction engineers, environmental specialists, and City and King County maintenance personnel.

Construction of the vacuum sewer collection system is tentatively scheduled for 2005 - 2006 and would be completed in conjunction with the King County wastewater treatment plant.

a. Summary of Mitigation Measures

Mitigation measures have been organized by element of the environment and the type of impact they are mitigating (construction-related impacts or operational impacts).

Soils and Geology

Construction

Erosion

- Develop and implement comprehensive erosion and sediment control plans for each phase of construction in accordance with the Washington State Department of Ecology's *Stormwater Management Manual for Western Washington* (Ecology, 2001). The plans could include elements for site stabilization, slope protection, drainageway protection, and sediment retention.
- Spill and erosion prevention and sediment control plans, as well as observance of all applicable safety and environmental regulations for handling chemicals, would be in place to minimize risks.
- Monitoring could be required during construction to ensure compliance with the site erosion and sedimentation control plan and local regulatory requirements.

Contaminated Soils

- If necessary, environmental site assessments and hazardous material surveys would be performed prior to construction.
- If contaminated soils or groundwater were discovered, they would be cleaned up before construction disturbs the contaminated area.
- A hazardous materials management plan would be prepared to specify procedures, including identification, storage, and disposal, for work in areas where contaminated soil could be encountered.

Vibration and Settlement

- Where necessary, pre- and post-construction surveys of structures adjacent to construction areas would be performed.
- Additional mitigation for structures determined vulnerable to settlement could include underpinning, reinjecting dewatering water, modifying construction techniques, using displacement grouting, installing flexible connectors, and re-leveling or repair.
- A geotechnical exploration program with borings more closely spaced along the chosen conveyance route would be undertaken where appropriate.
- If shoring or heavy equipment operation would occur close to existing structures, at-risk structures would be monitored to minimize risk of vibration damage.
- All excavation sloping and shoring would be designed in accordance with worker safety regulations.
- The dewatering system would be adjusted to pump the minimum quantity necessary.

Seismic Hazards

- All permanent structures would be designed to conform to International Building Code requirements.

Operation

Erosion

- Vegetation would be maintained to help control surface water runoff during the operational life of the wastewater facilities.
- Surface water runoff controls would be provided as required by regulatory agencies.

Chemical Spills

- Facilities would be designed to prevent and/or contain leaks or spills of chemicals handled on-site. Equipment would be regularly inspected to prevent leaks and spills.

Air Quality

Construction

- Air quality impacts would be minimized by following construction best management practices (BMPs) such as wetting and covering disturbed soils, washing tires and undercarriages of vehicles, vacuum-sweeping adjacent streets, and shutting off idling equipment.
- Potential airborne contaminants would be contained by cleaning and covering areas that could release contaminants and meeting air quality standards for site emissions.

Operation

- Major treatment processes would be covered or enclosed and the air vented and treated in a central odor control station.
- An odor monitoring and response plan would be developed during the permitting process.
- Equipment and vehicles would be kept in good working order to reduce emissions.

Surface Water and Ground Water

Construction

- Comprehensive erosion and sediment control plans would be developed for each phase of construction. The plans would include elements for slope stabilization, slope protection, drainageway protection, and sediment retention.
- Construction would be performed during the dry season to the extent possible.
- Containment and spill plans and procedures would be provided where chemicals are stored and loaded.
- To minimize turbidity, all water from dewatering operations would be routed through sediment removal facilities as needed prior to eventual discharge either to infiltration trenches or designated receiving water bodies. If dissolved oxygen were found to be low, the water would be aerated prior to discharge into any surface water body. Discharge of dewatering water would comply with construction NPDES standards and permit requirements.
- Control the release of construction dewatering water into nearby surface water bodies to minimize erosive velocities and the potential for erosion, turbidity increases, and sedimentation.
- Maintain vegetation and provide adequate surface water runoff systems.
- Limit the amount of area that is cleared and graded at any one time, and schedule construction activities soon after an area has been cleared and stripped of vegetation.
- Construct temporary siltation/sedimentation ponds to detain runoff waters and trap sediment from erodible areas.
- Revegetate or pave disturbed areas as soon as possible after completion of construction.
- Place straw, mulch, or commercially available erosion control blankets on slopes that require additional protection.
- Place straw bales or silt fences to reduce runoff velocity in conjunction with collection, transport, and disposal of surface runoff generated in the construction zone.
- During construction, monitoring programs could be required to ensure compliance with the site erosion control plan and with local regulatory requirements. The construction contractor and/or City or County staff could measure parameters such as turbidity, temperature, and pH of surface water discharge and visually monitor the site for signs of erosion and for correct implementation of control measures. Water resource protection requirements of NPDES general permit for construction, Washington Department of Fish and Wildlife (WDFW) Hydraulic Project Approval (HPA) permits, and King County sensitive areas permits would be implemented.
- In the unlikely event that a construction accident or spill releases contaminants into waterways or the surrounding environment, BMPs (such as oil booms and absorbent

pillows) could be employed and utilized to contain and minimize the spill.

Operation

- Discharge would be regulated by Washington State Department of Ecology (Ecology) through the facility's NPDES operating permit to ensure that the beneficial uses of the receiving waters are maintained to protect human health, aquatic life, and water quality.
- Conduct water quality monitoring to ensure the treatment plant, conveyance pipeline, and outfall are meeting or exceeding water quality standards.
- Reliability and redundancy would be included in mechanical and electrical equipment at the wastewater treatment plant to prevent any untreated or partially treated water from leaving the facility.
- Collect stormwater generated from areas where wastewater and solids are handled and treat in the wastewater treatment plant.
- Maintain vegetation and provide adequate stormwater runoff controls during the operational life of the wastewater facilities.
- The treatment plant design would include extensive BMPs and source controls to minimize the risk of contamination from spills and leaks, in the rare event that a spill were to occur. Spill containment provisions include double-walled storage facilities and emergency cleanup procedures. The site would be sloped to direct any drainage from spill-prone areas (i.e., sludge loading) back to the treatment plant for processing.
- Discharge pipe would be designed to prevent erosion and minimize sediment buildup. Monitoring would assess the need for maintenance.
- Routine pipeline maintenance and monitoring would be conducted regularly to detect any malfunctions and minimize the risk of leaks of highly treated water.
- To prevent overflows, the treatment plant would be designed to meet the reliability and redundancy standards required for the plant operation and discharge.
- If an overflow occurred, appropriate cleanup measures would be initiated and water quality monitoring would be conducted until conditions returned to background levels. In addition, Ecology would be notified within 24 hours of the emergency overflow.

Floodplains

- Any portion of the treatment facility or a discharge facility located within the flood hazard area would be designed to meet flood-proofing and/or flood-protection elevation requirements under the City of Carnation development regulations for flood hazard areas, as well as FEMA regulations.

Vegetation

- Restore disturbed areas to the maximum extent possible.

Wetlands

Impacts to wetlands are not anticipated; therefore, mitigation measures have not been developed.

Fish and Wildlife, Threatened and Endangered Species

Construction

- Prepare a bald eagle management plan as required by the Bald Eagle Protection Rule (WAC 232-12-292) for proposed land use activities involving property containing or adjacent to an eagle nest.
- Perform pre-construction surveys and prepare management plans for bald eagle and salmonid species to avoid or minimize impacts to special-status species present near construction sites.
- Provide treatment of construction dewatering discharges, such as sediment removal or filtration, as necessary before the release of such water to wetlands or streams.
- Clearly identify construction areas to minimize habitat disruption.
- Restore disturbed areas to the maximum extent possible.
- Schedule construction within work windows specified by WDFW, NOAA Fisheries, and/or US Fish and Wildlife Services to avoid critical periods (i.e., nesting and breeding/spawning, migration, overwintering) for wildlife and fish. Confine in-stream work, where unavoidable, to the period designated by WDFW when salmonids are least likely to be present.
- Boundaries of construction areas would be clearly identified to avoid encroachment into adjacent habitat.
- Discharge facilities could be designed to minimize habitat disruption.
- Disturbed areas would be restored to the maximum extent practicable.
- Construction work windows for special-status fish and wildlife species would be followed as required by state and federal agencies.
- Implement “Reasonable and Prudent Measures” relating to urban development, water quality degradation, and in-water construction agreed to during the Federal Endangered Species Act Section 7 Consultation with NOAA Fisheries and USFWS.
- Construction BMPs and a Stormwater Pollution Prevention Plan would be implemented to minimize sedimentation of water bodies.
- A Spill Prevention, Containment, and Control Plan would be implemented and construction BMPs used to reduce the risk of accidental spills and respond to a spill should one occur.
- If wetlands were permanently impacted, the appropriate compensatory mitigation would be implemented.

Operation

- Treatment facility design would include measures to prevent emergency overflows.
- Treatment methods that minimize the need for chemicals of concern could be used.
- The stormwater system would be designed to meet state water quality standards including measures to reduce discharge of higher temperature stormwater.
- Noisy equipment would be enclosed or shrouded to avoid impacts to noise-sensitive species.
- Water quality monitoring would be conducted to ensure that the highly treated water discharged meets or exceeds water quality standards.

Recreation

Construction

- A comprehensive notification system could be developed to alert users of recreational facilities about possible street disruptions and restricted-use areas.
- Where Snoqualmie Valley Trail use is disrupted, a safe, signed detour around the construction area would be provided. Small sections of the trail would be detoured around the local construction area. The trail would be restored following construction.
- Temporary fencing could be installed around construction areas.

Operation

- Signs would be placed in discharge areas where recreational use may occur to make the users aware that treated wastewater is being discharged.

Visual Aesthetics

Construction

- Visual barriers could be installed around the construction area of the treatment plant.
- Construction BMPs could be used to minimize visual impacts along the conveyance route (e.g., minimizing areas of disruption, covering excavated materials, and keeping construction areas clean).

Operation

- The facility could be visually screened with fencing and vegetation.
- The treatment plant site plan could be designed to locate less visually pleasing areas away from sensitive neighbors; treatment functions could be enclosed in structures where possible.
- A community-supported design theme could be used to reflect the agricultural heritage or other values of the community.
- Exterior lighting would be low-level and designed to comply with Illumination Engineering Society of North America requirements such that no direct beam illumination would leave the facility site.

Public Services and Utilities

Construction

- Notify local service providers and schools in the immediate vicinity of the project area about proposed construction activities, including project location and timing.
- Where necessary, traffic control plans would be developed with emergency service providers to ensure emergency access routes are maintained during construction.
- Coordinate construction with local utilities to minimize impacts to utility lines.
- Any utility service relocation, disruptions, or damage would be coordinated or reported to the utility purveyors.

- Coordinate with local emergency service providers to ensure that they have necessary training and equipment to assist in an emergency related to the treatment system.
- If utilities need to be relocated, construction activities would encounter electrical transformers containing oil that is considered a hazardous substance under state regulations. These would be handled carefully to avoid a release or accidental spill during the relocation of transformers.
- Police, fire, ambulance, and local transit would be notified of any street blockages.

Energy

Operation

- Consider energy performance and conservation in the overall wastewater treatment facility design.
- Incorporate LEED (Leadership in Energy and Environmental Design) energy conservation criteria into the wastewater treatment plant design.

Transportation

Construction

- Develop a traffic control plan for construction to ensure continued vehicular, pedestrian, and bicycle access on streets in the project vicinity. Coordinate with local agencies for final plan approval, including any traffic detour plans, construction hours, and acquisition of necessary permits for construction.
- Notify the police, fire, ambulance, and local transit of any street blockages and provide flaggers or other traffic controls to maintain safe public access along adjacent streets.
- Provide parking for construction equipment, trucks, and other vehicles on site to avoid impacts to adjacent streets.

Noise

Construction

- Construction activities would typically occur during weekdays between permitted construction hours (City of Carnation – 7 a.m. to 7 p.m., King County – 7 a.m. to 10 p.m.). Any construction activities required outside of exempt daytime hours would require a variance, and the public would be notified as needed.
- Modern construction equipment would be used to minimize noise.
- Where practicable, noisy portable equipment, such as generators, would be located as far away from sensitive receptors as practical and would be muffled. Operation of the generator used for construction dewatering (if needed) would be required to meet allowable noise levels in the City's noise ordinance.
- Noise barriers or other measures could be used to minimize noise impacts on sensitive receptors.
- Construction haul routes could be located to minimize impacts on sensitive receptors as appropriate.
- A 24-hour hotline could be set up to receive complaints about noise; flyers could be sent

to the community well in advance of construction to inform them about the project.

Operation

- Vehicles and trucks used to transport solids would be maintained in good working order.
- Noise-attenuating features such as insulation, louvers, or sound-insulating enclosures could be provided for noise-producing equipment.
- Vibration mounts and over-vibration cut-out controls could be installed on equipment with a high level of vibration.
- Emergency generator testing could be scheduled to minimize noise impacts to surrounding properties.
- Structural features and/or landscaping could be used to minimize noise impacts of day-to-day operations.

Cultural Resources

Construction

- Presence of known cultural resources would be taken into account when designing facilities; cultural resources would be avoided wherever possible.
- To minimize the potential for impacts to unrecorded cultural resources, a professional archaeologist could be retained prior to construction to conduct additional research and site-specific investigations of facility sites.
- If determined necessary, excavation could be monitored by a professional archaeologist.
- If needed, a cultural resources data recovery plan could be developed by a professional archaeologist, with input from applicable tribes.
- If determined necessary, excavation could be monitored to assess potential vibration impacts to historic structures.
- If cultural resources are encountered during construction, construction would cease and the appropriate archeological resource agencies would be contacted.
- Any potential impacts to historic resources on or eligible for the National Register of Historic Places (NRHP) would be mitigated through consultation with appropriate archeological resource agencies. Mitigation may include photo-documentation.

Land Use

Construction

- Comply with all applicable building and land use codes, including grade and fill regulations.

Operation

- Comply with all applicable building and land use codes, including zoning, floodplain regulations, and shoreline management regulations.

Population, Socio-Economics, and Environmental Justice Communities

- Grant funding will continue to be sought to further reduce overall project costs paid by the Carnation residents served by the wastewater treatment system.
- Grant funding will also be sought for environmental justice communities to reduce cost to adversely affected low-income populations.

2. POLICY AND LEGAL CONSTRAINTS

The City of Carnation Municipal Code contains zoning and development restrictions, land use regulations, and other environmental protections. This project is consistent with City code. King County also maintains environmental protections for the areas outside the city limits. USFWS, NOAA Fisheries, and the WDFW have a wide variety of state and federal laws to protect the environment. This project is consistent with all applicable local, state, and federal regulations.

3. CONFORMATION WITH STATE IMPLEMENTATION PLANS (AIR QUALITY)

There are no State Implementation Plans for air quality with which the project must conform.

CHAPTER 6. PUBLIC PARTICIPATION

Beginning in January 2003, the City of Carnation and King County conducted extensive public involvement activities for the project. Some of these activities, conducted through May 2005, are as follows:

- Twenty-five interviews were held with community and interest group representatives to gather input regarding concerns, issues and opinions about the treatment facility and ways to involve the public. Key issues raised during the interviews were: the need for a treatment plant, costs, and the need to consider a range of discharge options (not just river discharge).
- Four Citizen Advisory Committee (CAC) meetings on facility siting were held to obtain input on the development and application of siting criteria, and on the results of the siting process. Tribal representatives were included on the CAC. Based on CAC input, King County decided to evaluate both river discharge and upland infiltration options, along with two treatment plant sites, and committed to developing a SEPA EIS to fully evaluate the alternatives and provide more opportunities for public input.
- Nine community meetings were held to provide information about the project, obtain feedback on the siting process and criteria, discuss the treatment process and discharge options, and explain the decision process and factors. Input on design of the treatment plant and discharge options was also requested. City staff participated in all these meetings. The county heard broad support for the wetland discharge option. The city heard concerns about costs of the project to ratepayers.
- A site tour was conducted at Stillwater Wildlife area in conjunction with the Washington State Department of Fish and Wildlife to discuss the wetlands enhancement discharge options. There was general support for a wetland discharge option.
- Numerous meetings were held with property owners near the treatment plant sites and discharge locations.
- Numerous meetings were held with tribal representatives.
- Project staff attended and participated in the City of Carnation's open houses and City Council meetings.
- Project staff prepared frequent briefings to tribes, political leaders, and community and interest groups.
- A charrette was held to identify wetland discharge alternatives. Stakeholder groups, permitting agencies, and resource agencies attended the charrette.

- Four fact sheets were prepared and distributed to provide information about the project.
- King County maintained an ongoing project Web site to provide updated project information.
- Staffing was provided at an information booth at Carnation's Fourth of July Festival each year.
- A toll-free telephone number and e-mail address were provided to receive public input and questions.
- Six newsletters and several updates were prepared and mailed to area citizens and to a distribution list developed during activities listed above.
- Responses to requests for information and questions from individuals and groups were provided.

Environmental Impact Statement Public Involvement Process

In summer 2003, King County conducted an expanded SEPA scoping process for a Draft Environmental Impact Statement (EIS) under WAC 197-11-410. As lead agency for SEPA review, King County issued a Determination of Significance and scoping notice on July 28, 2003. The scoping notice described the alternatives being considered and requested comments on issues and alternatives to be addressed in the EIS.

About 4,000 scoping notices were distributed to potentially affected parties. A public hearing/open house was held at the Carnation Elementary School on August 6, 2003. A separate meeting for regulatory agency representatives was also held on that day. A notice was provided on the project Web site, legal notices were placed in local newspapers, and other legal notification requirements were met. King County allowed more than 45 days for scoping comments to be prepared and submitted. The comment period ended on September 12, 2003.

King County received a total of 76 individual scoping comment submittals (letters, e-mails, mail-back comment forms from the scoping notices, and/or testimony to a court reporter) from 66 parties. Many submittals contained multiple comments. Of the 66 commenting parties, 53 were individual citizens, 9 were public agencies, and 4 were interest groups or other organizations.

In response to comments received during the scoping process, the county recommended considering three alternatives for discharging highly treated wastewater from the proposed Carnation treatment plant in the EIS. The discharge alternatives included: a river discharge at Carnation Farm Road Bridge that is more consistent with planned habitat restoration efforts; an upland infiltration site south of the city; and a wetland enhancement discharge option at the state's Stillwater Wildlife Area.

King County issued a Draft EIS on June 28, 2004 to provide environmental information to the public and agencies and to solicit comments on the proposals and issues discussed in the EIS. King County provided a 30-day public comment period for interested citizens, groups, agencies and governments to review the EIS and provide comments. A public hearing was held on July 14, 2004 to receive public testimony on the Draft EIS. The public comment period closed on July 27, 2004.

King County received a total of 28 sets of comments on the Draft EIS. Of these, 19 were from individuals, 8 were from government agencies, and 1 was a private group. Comment letters raised a variety of issues and expressed opinions on the Draft EIS and proposal itself. Some of the issues raised included potential flooding of the treatment plant, concerns over the amount of study that has been conducted to date on the upland discharge alternative, construction impacts, and odor impacts during operation. Opinions expressed on the Draft EIS and proposal itself included support for the wetland alternative, concern over the cost of the project, and support for the No Action Alternative. The comments and King County's responses were provided in the Final EIS. The Final EIS was issued on October 15, 2004.

The Final EIS was one of the tools used by the King County Executive, in consultation with the City of Carnation, in making a decision on the Carnation Wastewater Treatment Facility. The Final EIS provides information on the potential environmental impacts of the proposal. The Executive and the City of Carnation considered these and other factors, including cost, engineering, community, and policy issues, into account in reaching a final decision. The public involvement process will continue through the NEPA environmental review, facility design, permitting, construction and operation.

Chapter 9 contains a partial mailing list and describes agency consultation.

CHAPTER 7. DOCUMENTATION

The following documents and sources have provided reference material for, or were specifically prepared in support of, the proposed project.

- American Engineering Corporation. 2000. *City of Carnation Comprehensive Sewer and Facilities Plan*. November 2000.
- Bishop, G. 2003. Supervisor, Community Environmental Health, Seattle & King County Public Health Department. Letter to City of Carnation regarding Sewer Development in the City of Carnation. September 9, 2003.
- BOAS, Inc. 2005. *Cultural Resources Survey of the Proposed City of Carnation Sewer Collection and Conveyance System and Wastewater Treatment Facility*, 2005.
- Brookshire, Jennifer. Washington Department of Fish and Wildlife. Personal communication. March 31, 2004 – telephone conversation regarding great blue heron and bald eagle nesting in Carnation area.
- Carollo Engineers. 2003. *Carnation Wastewater Treatment Facility, Technical Memorandum No. 11, Evaluation of Discharge Alternatives – Draft*. November 2003. Seattle, WA: Prepared for the King County Department of Natural Resources and Parks.
- City of Carnation. 1996. *City of Carnation Comprehensive Plan*.
- City of Carnation. 2000. *City of Carnation Comprehensive Sewer and Facilities Plan*.
- East King County Ground Water Advisory Committee. 1998a. *East King County Ground Water Management Plan, Management Strategies*. Final. December 1998.
- East King County Ground Water Advisory Committee. 1998b. *East King County Ground Water Management Plan Supplement 1 – Area Characterization*. Final. December 1998.
- FEMA. 2003. Floodplain Maps.
- Haring, D. 2002. *Salmonid Habitat Limiting Factors Analysis: Snohomish River Watershed, Water Resource Inventory Area 7, Final Report*. Washington Conservation Commission. Olympia, Washington.
- King County. 1995. *Historic Overview, City of Carnation, Washington*.
- King County. 2004. King County Community Development Block Grant Program census block map, 2004.
- King County. 2004. *King County Comprehensive Plan*.
- King County. 2004. *Carnation Wastewater Treatment Facility, Draft Environmental Impact Statement and Technical Memoranda*, prepared for the King County Wastewater Treatment Division. June 2004.
- King County. 2005. *Carnation Wastewater Treatment Facility and Outfall Biological Assessment and Essential Fish Habitat Assessment*. Prepared for US Environmental Protection Agency, Region 10.

- Kleeberg, C. 1988. Director, Environmental Health Division, Seattle & King County Public Health Department. Letter to City of Carnation regarding Sewer Development in the City of Carnation. April 19, 1988.
- Kleinfelder, Inc. 2003. *Geotechnical Report for Carnation Wastewater Collection and Conveyance System*.
- Kunz, K. 2005. Chief, North Application Review Section, U.S. Army Corps of Engineers Seattle District. Letter to King County Wastewater Treatment Division regarding Department of Army permit to construct a wastewater treatment facility and outfall in the Snoqualmie River near Carnation, Washington. May 3, 2005.
- Landau Associates. 2004. *Technical Memorandum, Sensitive Area Reconnaissance for the Sewer Collection and Conveyance System Project*, City of Carnation, Washington, prepared for Roth Hill Engineering Partners, LLC, Bellevue, Washington. March 30, 2004.
- Larson Anthropological Archaeological Services Limited (LAAS), April 5, 2004, *Technical Report for Carnation Wastewater Treatment Facility Project EIS, Cultural Resources Overview, King County, Washington*. Submitted to King County Department of Natural Resources and Parks, Seattle, Washington.
- Roth Hill Engineering Partners. 2005. *Final Draft City of Carnation 2004 Sewer Facilities Plan*. April 2005.
- R.W. Beck. 1991. *Geotechnical Engineering Study*.
- U. S. Census Bureau. 2000. Census 2000.
- United States Soil Conservation Service. 1973. *Soil Survey, King County Area, Washington*.
- U. S. Environmental Protection Agency. *Understanding the Safe Drinking Water Act*.
- Washington State Department of Ecology (Ecology). 1994. *Snoqualmie River Total Maximum Daily Load Study*. Ecology Report #94-71 by Joe Joy. May 1994. Olympia, WA: Washington State Department of Ecology.
- Washington State Department of Ecology. 1998. *Sewage Design Manual*.
- Washington State Department of Ecology. 2001. *Stormwater Management Manual for Western Washington*.
- Washington State Department of Ecology. 2005. Washington State's Water Quality Assessment [303(d) & 305(b) Report]. Final 2004 Integrated Water Quality Assessment.
- WDFW (Washington Department of Fish and Wildlife). 2003. Priority Habitats and Species database information.
- Young, Curt. Manager, Stillwater Wildlife Area. Personal communication. March 31, 2004 – telephone conversation regarding bald eagle and general wildlife occurrence.

CHAPTER 8. REASONS FOR CONCLUDING THERE WILL BE NO SIGNIFICANT IMPACT

The project as a whole will comply with all applicable federal, state, and local permit requirements for the construction and operation of a new wastewater treatment plant, vacuum sewage collection system, and outfall into the Snoqualmie River. A new NPDES permit will be issued prior to the new plant coming on line. The project will be consistent with the City of Carnation's comprehensive plan for growth in the city within the Urban Growth Area. The project will not result in any significant impact on the environment. Implementation of the project and proposed mitigation measures will result in improved wastewater treatment and likely benefit water quality in the area.

The proposed vacuum sewer alignment will be located, for the most part, in rights of way containing existing water, telephone, and cable utilities. The proposed project will have no significant impact on existing land use or local, regional, or State land use plans and policies. There will be no impact to wetlands. The project is consistent with the requirements of the Endangered Species Act (ESA). A Biological Assessment (BA) has been prepared to analyze the potential impacts of the project on listed and candidate species. Prior to construction, both the US Fish and Wildlife Service and NOAA Fisheries must conclude that the project, as conditioned with appropriate conservation measures, does not jeopardize listed species and is consistent with the ESA. The project will not proceed prior to the Services reaching this conclusion. There will be no displacement of populations and there will be no adverse effect on farmlands or agricultural operations. No significant impacts to floodplain areas within the City are expected. Additionally, the proposed project is not expected to have significant impacts on any cultural or historical locations within the project area. While the analysis indicates the existence of cultural artifacts within the project area, the overall design is somewhat flexible and can be altered to some extent to avoid any foreseen impacts to these artifacts.

The proposed project will have a beneficial impact on groundwater quality and on future development within the project area. A health hazard has been declared due to the failing and inadequate septic systems. The introduction of the sewer collection, conveyance and treatment system may entice lost business back to the City, thus improving the financial situation of the City. Any development would be controlled in accordance with approved City plans and policies, and would therefore be controlled and maintained so as not to cause a significant adverse impact on the City, as outlined in 40 CFR Section 6.108 (g).

King County will be constructing the wastewater treatment facility that will treat and discharge effluent from collected wastewater. Therefore, King County has prepared an EIS (October 2004) which addresses the issues of treated effluent being discharged into a water body and, its classification and the quality of effluent, per 40 CFR Section 6.509. A summary of these findings has been provided in the EA. The project is supported by many of the Carnation residents. Though several elements of the project have been criticized, such as cost issues to businesses and residences and discharge of treatment wastewater to the Snoqualmie River, the project is not highly controversial.

For the above reasons, The City of Carnation and King County Department of Natural Resources and Parks feels that there are no significant adverse impacts on the environment.

APPENDIX A MAPS/FIGURES

List of Figures

- Figure 1 – Carnation and Vicinity
- Figure 2 – Urban Growth Area
- Figure 3 – Conceptual River Outfall Discharge
- Figure 4 – Vacuum System Current Sewer Pipe Design/Layout
- Figure 5 – Surface Water Bodies and Floodplains
- Figure 6 – Sensitive Areas Reconnaissance Drawing
- Figure 7 – Existing Land Use
- Figure 8 – Proposed Zoning

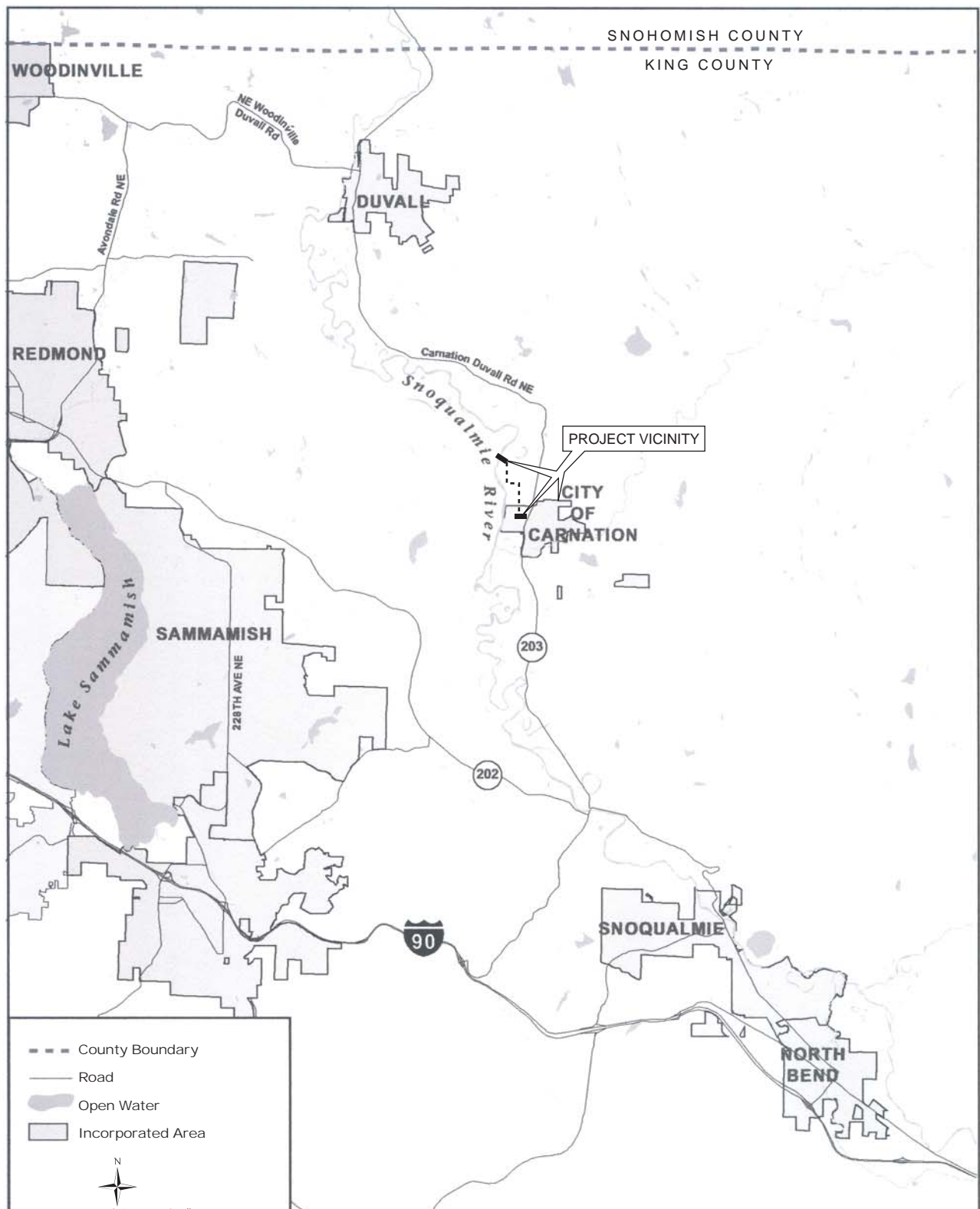


Figure 1

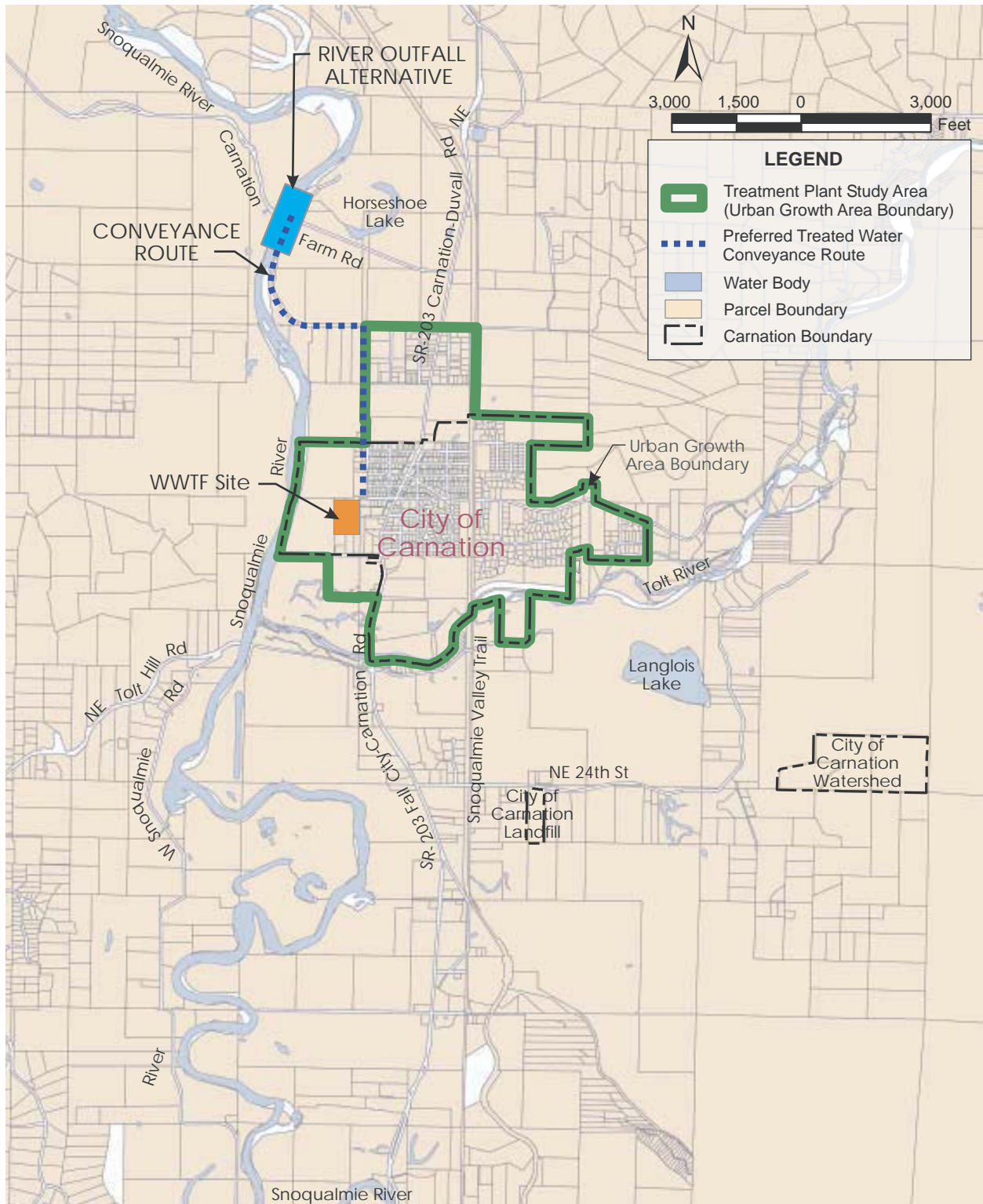


King County
Department of
Natural Resources and Parks
Wastewater Treatment Division

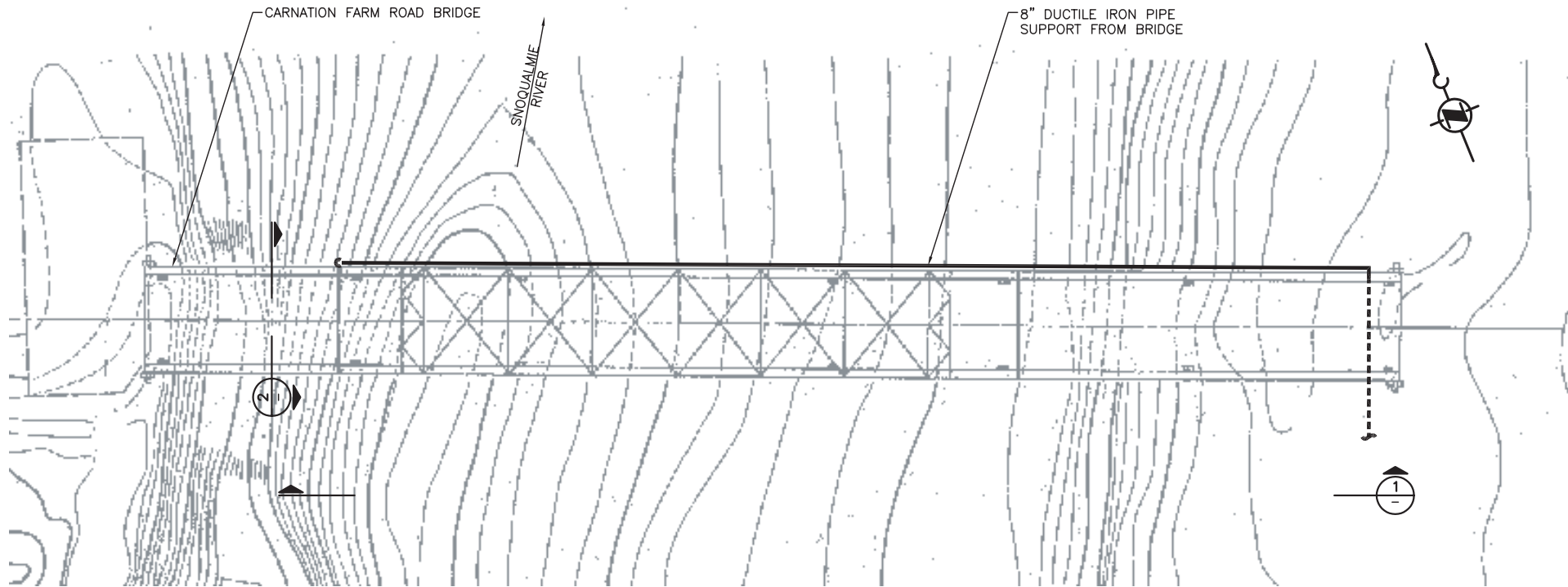
Carnation and Vicinity CARNATION WASTEWATER TREATMENT SYSTEM

The information included on this map has been compiled from a variety of sources and is subject to change without notice. King County makes no representations or warranties, express or implied, as to accuracy, completeness, timeliness, or rights to the use of such information. King County shall not be liable to any general, special, indirect, incidental, or consequential damages including, but not limited to, lost revenues or lost profits resulting from the use or misuse of the information contained on this map. Any sale of this map or information on this map is prohibited except by written permission of King County.

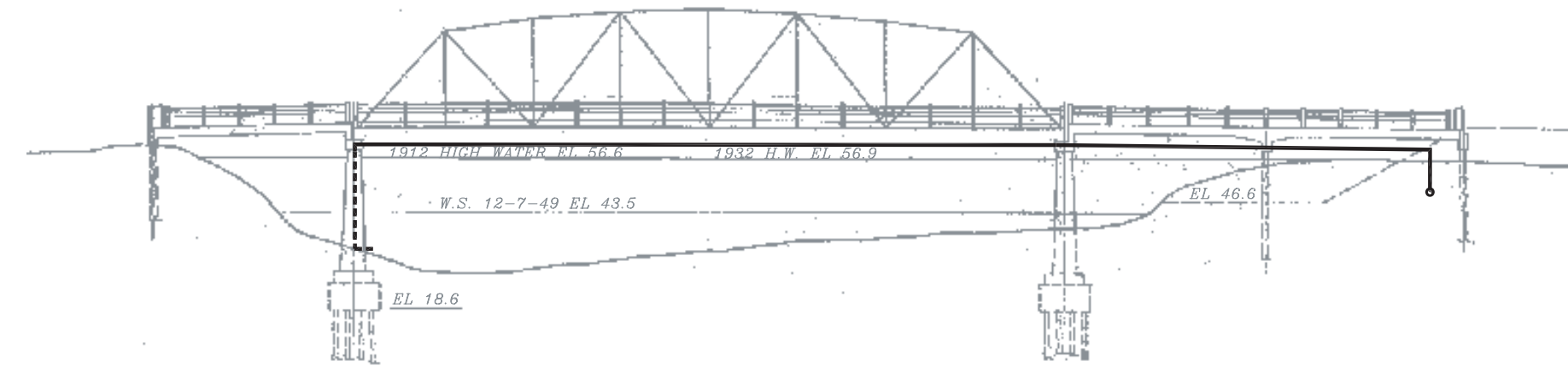
Data Sources: King County datasets. File Name: 0403_01-1_Figure.eps Prepared by: King County WLR Visual Communications & Web Unit



H:\client\kingco-dns_SEA\602010\Drawings\Figure_2_3-22-05_03:15pm.stb
XREFS: D-TL-KC-CARN BRIDGE.ELEV, BRIDGE.PLAN, PIER.



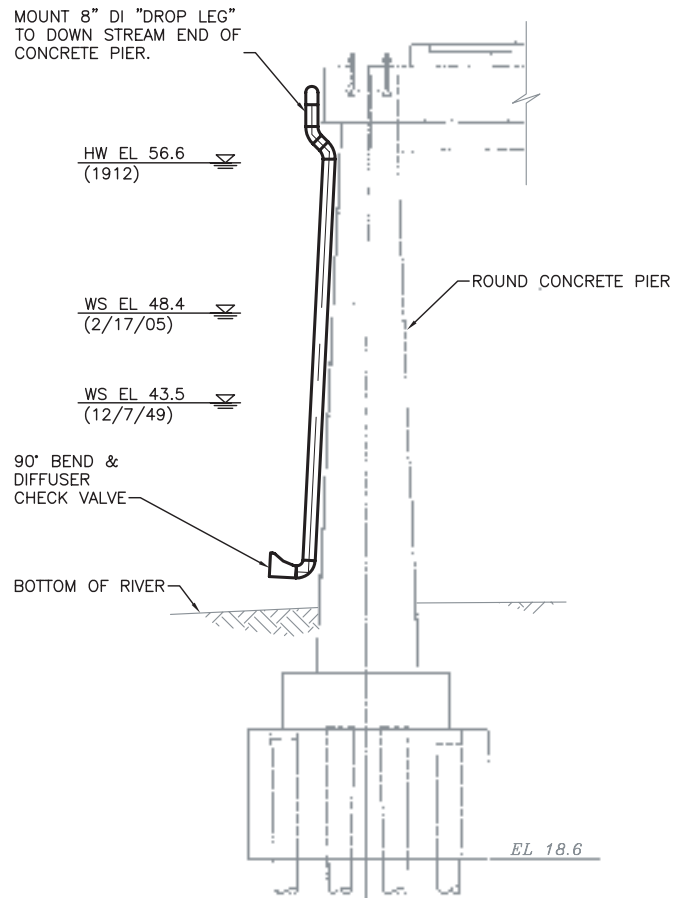
CARNATION FARM ROAD BRIDGE
PLAN
SCALE: 1" = 40'



BRIDGE
ELEVATION
SCALE: 1" = 40'

GENERAL NOTES:

1. CARNATION FARM ROAD BRIDGE AND RIVER PROFILES PREPARED IN APRIL 1950. ELEVATIONS SHOWN ARE BASED ON NAVD 88 DATUM.



PIER
ELEVATION
SCALE: 1" = 10'

ONE INCH
AT FULL SIZE, IF NOT ONE
INCH SCALE ACCORDINGLY

No.	REVISION	BY	APP'D	DATE



DESIGNED: SEF	CHECKED: NONE
DRAWN: SML	SCALE:
RECOMMENDED:	CONTRACT NO:
APPROVED:	C_____C



DEPARTMENT OF NATURAL RESOURCES & PARKS
CARNATION WASTEWATER TREATMENT FACILITY

FIGURE 3
CONCEPTUAL
RIVER OUTFALL DISCHARGE

DATE:
FILE NO: 423557/###
DRAWING NO:
SHEET NO: OF



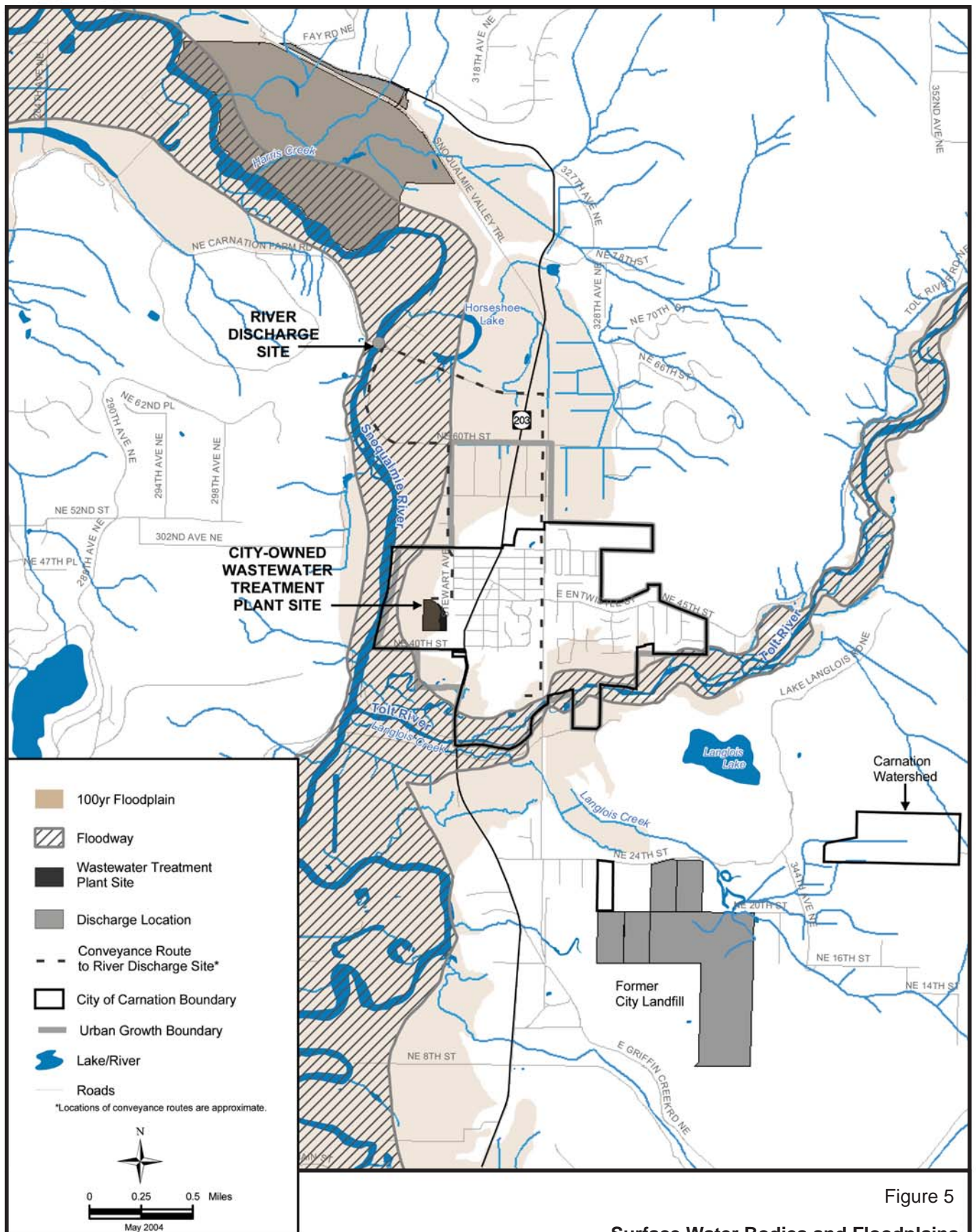
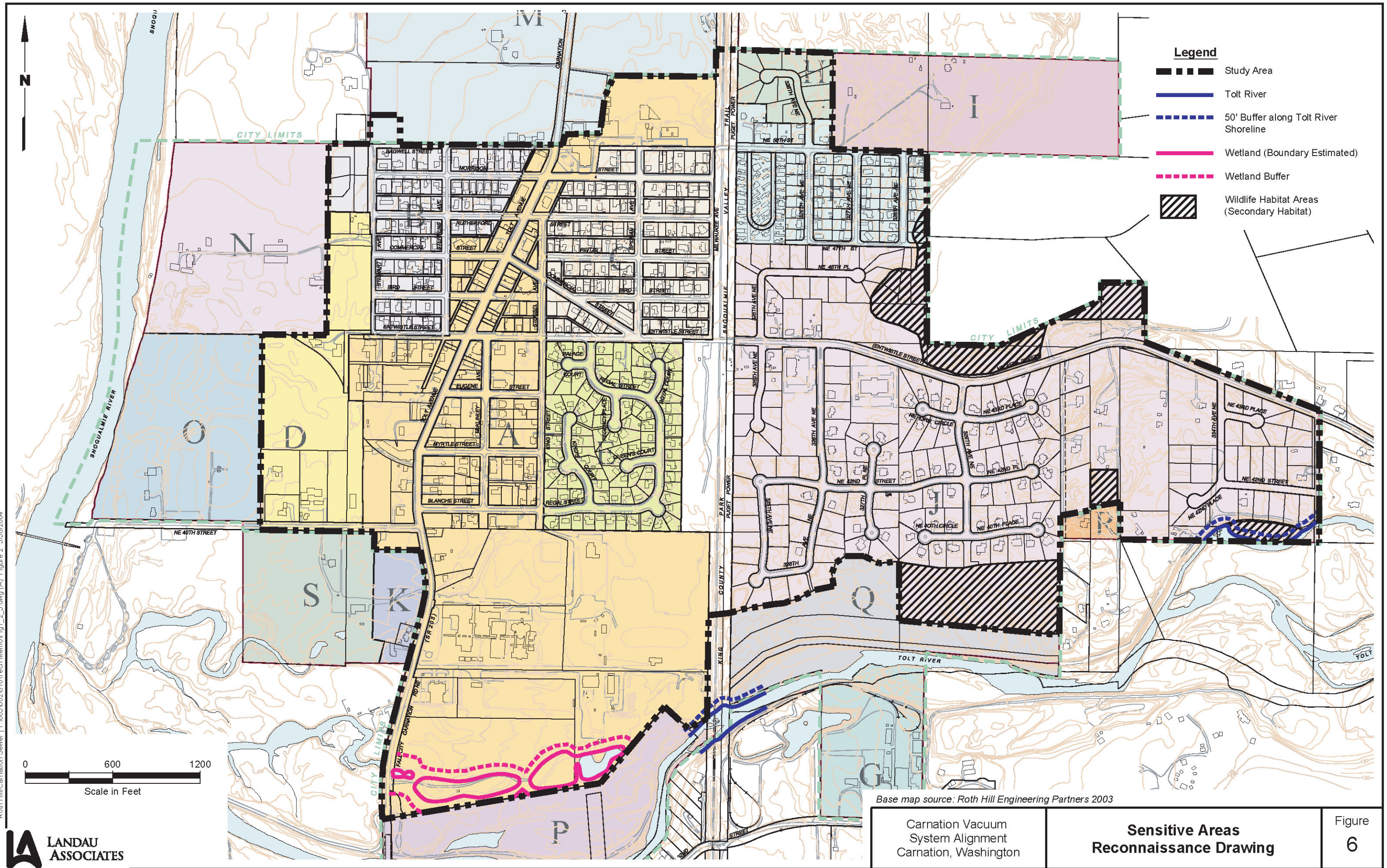












Figure 5

Surface Water Bodies and Floodplains CARNATION WASTEWATER TREATMENT SYSTEM



Legend

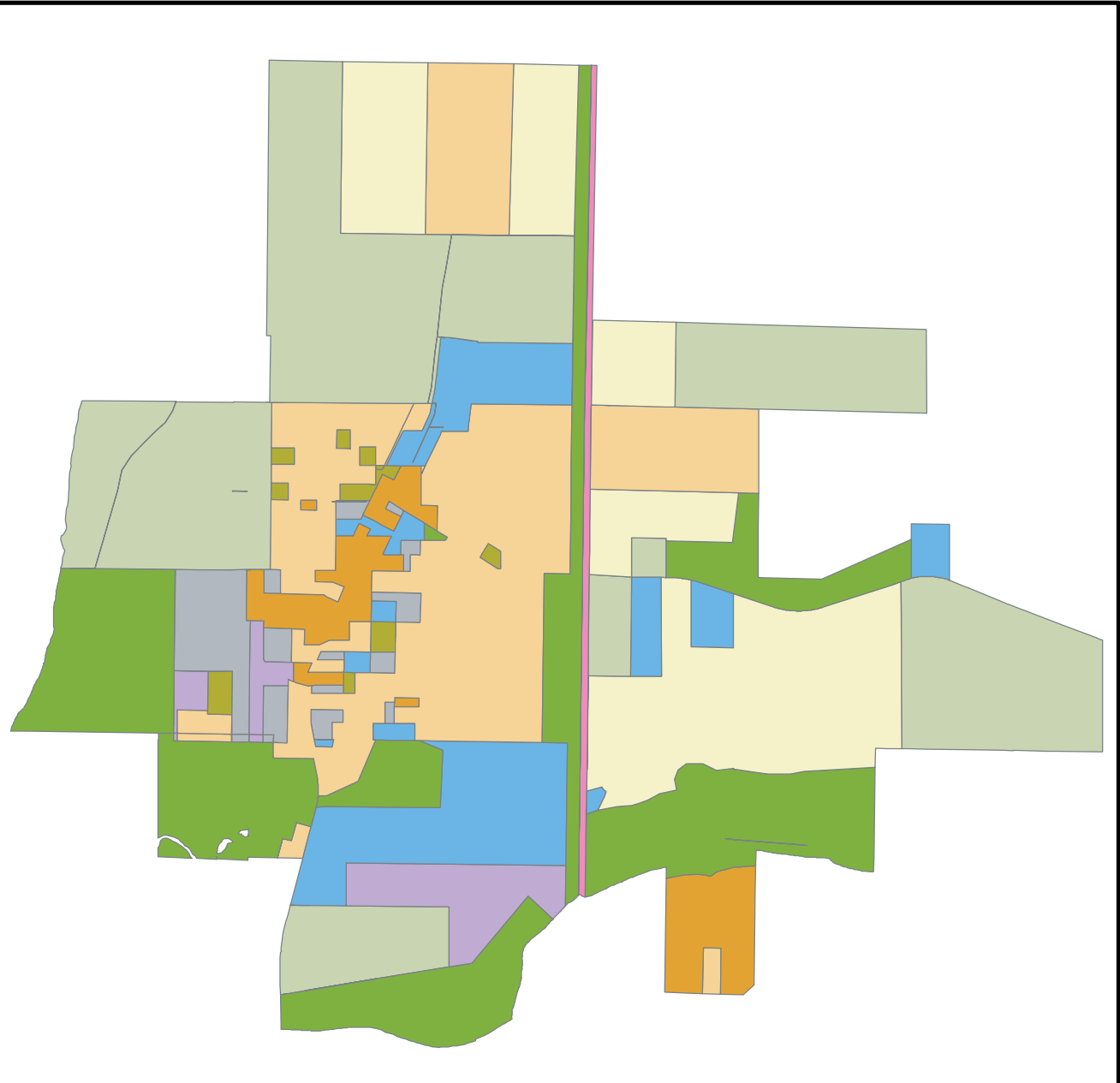
Existing Land Use

-  Medium Density Residential
-  Low Density Residential
-  Multi-Family Residential
-  Residential Agricultural
-  Commercial/Retail
-  Light Industrial/Manufacturing
-  Parks/Open Space
-  Public/Community Facility
-  Transportation, Utilities, Communications
-  Vacant



0 0.050.1 0.2 0.3 0.4 Miles

February, 2005



King County

Department of
Natural Resources and Parks
**Wastewater Treatment
Division**

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File Name:

Data Source:

Figure 7

Existing Land Use

City of Carnation, WA

Legend

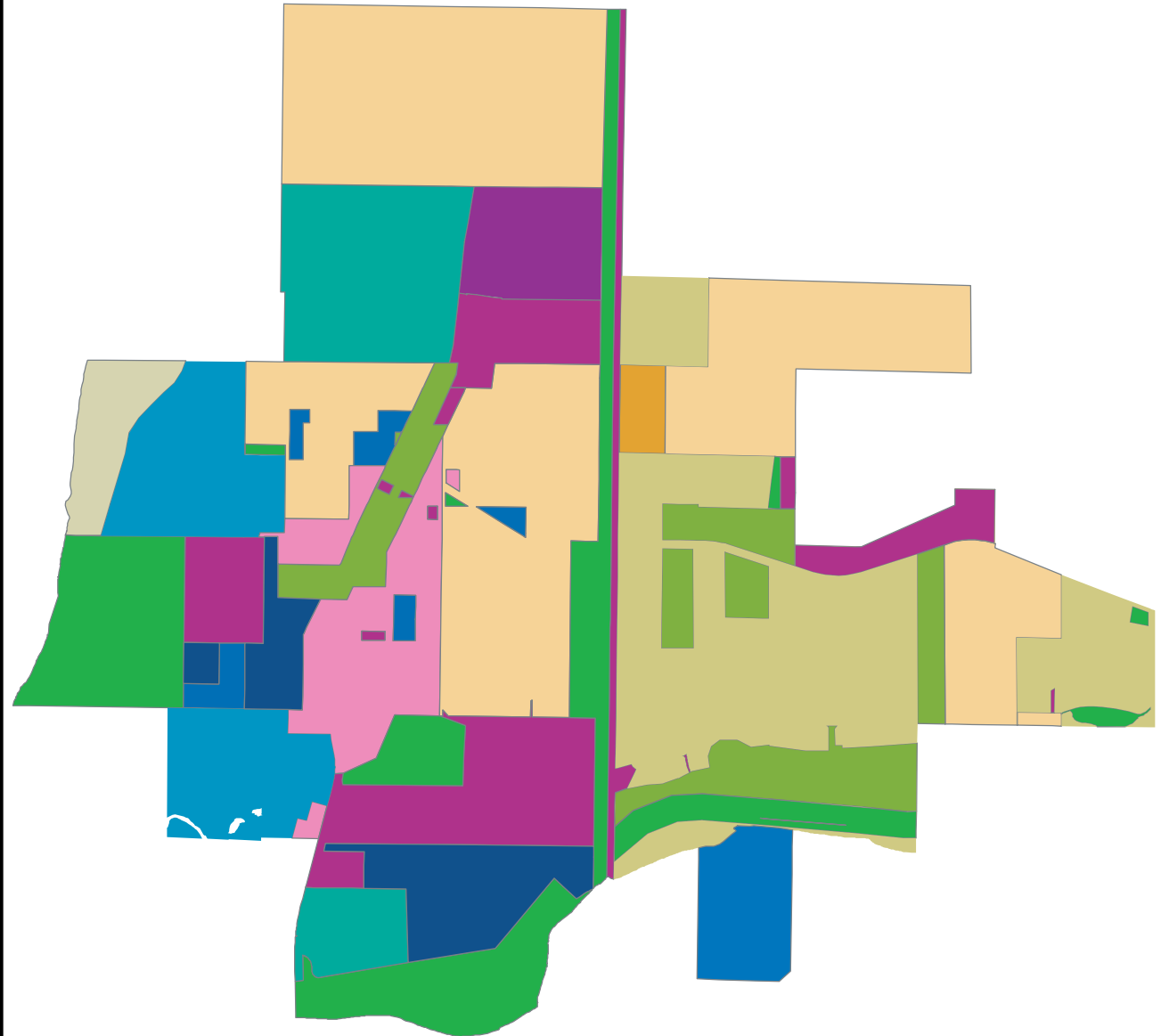
Proposed Zoning

- Residential - Agricultural
- Residential Single Family (12,500)
- Urban Residential Single Family (10,800)
- Urban Residential Single Family (10,800)
- Residential Mobile Home Park
- Multi-Family Residential
- Central Business District
- Mixed Use
- Mixed Use 2
- Horticultural Commercial
- Service Commercial
- Light Industrial/Manufacturing
- Public Use
- Parks
- Employment Office



0 0.05 0.1 0.2 0.3 0.4 Miles

February, 2005



King County

Department of
Natural Resources and Parks
**Wastewater Treatment
Division**

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File Name:

Data Source:

Figure 8

Proposed Zoning

City of Carnation, WA

APPENDIX B DISTRIBUTION LIST

Notice of document availability will be sent to the following agencies and organizations:

Federal Agencies

U.S. Environmental Protection Agency,
U.S. Fish and Wildlife Service
National Marine Fisheries

Tribes

Snoqualmie Tribe
Tulalip Tribe

Washington State Agencies

Department of Ecology
Department of Fish and Wildlife
Department of Health
Department of Transportation
Department of Archaeology and
Historic Preservation

Department of Natural Resources

Local Agencies

Puget Sound Clean Air Agency

King County

County Council
Executive's Office
Department of Development and
Environmental Services
Department of Community and Human
Historic Preservation Program
Public Health – Seattle and King County

Libraries and Newspapers

Carnation Public Library
Duvall Public Library
Fall City Public Library
Bellevue Regional Library
Snoqualmie Valley Record
The Seattle Times

Organizations and Businesses

Washington Trout
Seattle Audubon Society
Ducks Unlimited
Camp Gilead

APPENDIX C COST ANALYSIS TABLE OF PROPOSED PROJECT

Table C-1 City Service Sewer System Cost Projection				
Item Description	Approx. Quantity	Unit	Unit Cost	Total Cost
4-Inch Vacuum Sewer Main in R.O.W. or Paving 3 to 6 Feet Deep	16142	LF	\$ 47.00	\$758,674
4-Inch Vacuum Sewer Main in R.O.W. or Paving 6 to 9 Feet Deep	2051	LF	\$ 62.00	\$127,162
4-Inch Vacuum Sewer Main in Easement 3 to 6 Feet Deep	4642	LF	\$ 35.00	\$162,470
4-Inch Vacuum Sewer Main in Easement 6 to 9 Feet Deep	0	LF	\$ 50.00	\$0
6-Inch Vacuum Sewer Main in R.O.W. or Paving 3 to 6 Feet Deep	1751	LF	\$ 51.00	\$89,301
6-Inch Vacuum Sewer Main in R.O.W. or Paving 6 to 9 Feet Deep	4157	LF	\$ 67.00	\$278,519
6-Inch Vacuum Sewer Main in Easement 3 to 6 Feet Deep	1950	LF	\$ 40.00	\$78,000
6-Inch Vacuum Sewer Main in Easement 6 to 9 Feet Deep	752	LF	\$ 67.00	\$50,384
8-Inch Vacuum Sewer Main in R.O.W. or Paving 3 to 6 Feet Deep	3905	LF	\$ 56.00	\$218,680
8-Inch Vacuum Sewer Main in R.O.W. or Paving 6 to 9 Feet Deep	3135	LF	\$ 73.00	\$228,855
8-Inch Vacuum Sewer Main in Easement 3 to 6 Feet Deep	1809	LF	\$ 44.00	\$79,596
8-Inch Vacuum Sewer Main in Easement 6 to 9 Feet Deep	97	LF	\$ 61.00	\$5,917
10-Inch Vacuum Sewer Main in R.O.W. or Paving 3 to 6 Feet Deep	1582	LF	\$ 62.00	\$98,084
10-Inch Vacuum Sewer Main in R.O.W. or Paving 6 to 9 Feet Deep	10545	LF	\$ 79.00	\$833,055
10-Inch Vacuum Sewer Main in Easement 6 to 9 Feet Deep	2399	LF	\$ 67.00	\$160,733
Total Length of Main	54917			

(4) 10-Inch Boring Under SR 203 Crossing 7-8 Feet Deep (24" Casing)	600	LF	\$ 425.00	\$255,000
4-Inch Division Valve	53	EA	\$ 800.00	\$42,400
6-Inch Division Valve	19	EA	\$ 1,000.00	\$19,000
8-Inch Division Valve	12	EA	\$ 1,300.00	\$15,600
10-Inch Division Valve	21	EA	\$ 1,500.00	\$31,500
Side sewer service connection to building, re-route septic piping, 4" vent	698	EA	\$ 1,950.00	\$1,361,100
Standard 3-Inch Air Vacuum Interface Valves	363	EA	\$ 4,200.00	\$1,524,600
Crossover Connections	363	EA	\$ 350.00	\$127,050
Vacuum Station	1	LS	\$631,000.00	\$631,000
Telemetry Set-up for Alarm Conditions at City Hall	1	LS	\$ 12,500.00	\$12,500
Spare Parts / Special Tools / Portable Vacuum Pump	1	LS	\$ 80,000.00	\$80,000
Dual Buffer Tanks (for schools and Remlinger)	3	EA	\$ 5,500.00	\$16,500
Single Buffer Tanks (for businesses > 2000 gpd, incoming small f.m.)	5	EA	\$ 4,500.00	\$22,500
SUBTOTAL VACUUM FACILITIES				\$7,308,180
<u>Grinder System Facilities</u>				
3-Inch Grinder Pump Force Main in Easement 3 to 6 Feet Deep	2560	LF	\$ 37.00	\$94,720
3-Inch Grinder Pump Force Main Attached to Pedestrian Bridge	440	LF	\$ 125.00	\$55,000

Standard Grinder Pump Unit, Panel, and Lateral Gravity Connection	2	EA	\$ 4,050.00	\$8,100
Average Electrical Upgrade and Connection	2	EA	\$ 1,600.00	\$3,200
Standard Single 1.5-Inch Service from Main to Building	2	EA	\$ 1,500.00	\$3,000
SUBTOTAL ADDITIONAL GRINDER FACILITIES				\$164,020
SUBTOTAL				\$7,472,200
Contingency @ 10%				\$747,220
SUBTOTAL plus contingency - Total Before Tax Construction Cost				\$8,219,420
Washington States Sales Tax @ 8.4% of SUBTOTAL				\$690,431
Total Construction Cost Including Tax				\$8,909,851
Allied Costs @ 30% of Total Construction Cost				\$2,672,955
Total Project (Capital) Cost				\$11,582,806

Costs listed are for the basic sewer project only. Additional costs currently envisioned, include, but are not limited to, King County pre-payment for connection of businesses and residences to the new system (which would otherwise be paid over time as a rate component), archaeology consultant services and watermain construction, required due to location conflicts between water and sewer lines.

The estimated additional cost for these items is approximately \$4,540,000

APPENDIX D

CONSULTANT AND COORDINATION WITH OTHER STATE AND FEDERAL AGENCIES

The City of Carnation has been in direct contact via letters, meetings, Open House forums and individual and public meetings with:

Local agencies

- City of Duvall, Washington
- King County Wastewater Treatment Division
- King County Community Development Block Grant Program

State agencies

- Washington Dept. of Ecology
- Washington Public Works Board
- Washington Dept. of Fish and Wildlife

Federal agencies

- USDA Rural Development
- US Environmental Protection Agency (USEPA)
- US Army Corps of Engineers
- NOAA National Marine Fisheries Service
- US Fish and Wildlife Service

Legislators

- King County Executive Ron Sims
- US Senator Patty Murray
- US Senator Maria Cantwell
- US Representative "Doc" Hastings
- US Representative George Nethercutt
- US Representative Norm Dicks
- US Representative Jim McDermott
- US Representative Dave Reichert
- US Representative Jay Inslee
- US Representative Rick Larsen
- US Representative Brian Baird
- US Representative Adam Smith

Tribes

- Snoqualmie Tribe

Other Interested Parties

- Every citizen in Carnation
- All readers of the local newspapers (invited to public meetings)

Responses, comments and questions and response to comments and questions are available upon request.

APPENDIX E CULTURAL RESOURCES REPORT

This report has been prepared in conjunction with this project. Due to the large size, the document has been bound separately.

APPENDIX F BIOLOGICAL ASSESSMENT AND ESSENTIAL FISH HABITAT ASSESSMENT

The assessment report has been prepared in conjunction with this project. Due to the large size, the document has been bound separately.

APPENDIX G CORRESPONDANCE

This appendix contains the following correspondence:

Bishop, G. 2003. Supervisor, Community Environmental Health, Seattle & King County Public Health Department. Letter to City of Carnation regarding Sewer Development in the City of Carnation. September 9, 2003.

Kleeberg, C. 1988. Director, Environmental Health Division, Seattle & King County Public Health. Letter to City of Carnation regarding Sewer Development in the City of Carnation. April 19, 1988.



Public Health

Seattle & King County

HEALTHY PEOPLE. HEALTHY COMMUNITIES.

Alonzo L. Plough, Ph.D., MPH, Director and Health Officer

September 9, 2003

RECEIVED

SEP 11 2003

CITY OF CARNATION

Bill Brandon, City Manager
City of Carnation
4621 Tolt Ave.
P.O. Box 1238
Carnation, WA 98014

Re: Sewer Development in the City of Carnation

Dear Mr. Brandon:

In the 1987 the Health Department declared Carnation a public health hazard area based on the number of inadequately treating septic systems and likely contamination of the unprotected aquifer from which drinking water is provided. Since this 1987 declaration little has changed in regards to the disposal only septic systems and their potential to contaminate ground water.

Many septic system installations and legal repairs have taken place, over the last decade, which meet current regulations and can satisfactorily deal with most health concerns regarding wastewater treatment. A problem still remains however for the existing disposal only septic systems and illegal repairs, which may not be adequately treating the wastewater before disposing of it into the unprotected aquifer. Unfortunately without a lot to lot survey and comprehensive ground water studies the full extent of the health threat is impossible to determine.

The Health Department deals with issues on repairs and remodeling projects and must take into consideration long-term protection of the public's health. In some cases this may restrict how a property is utilized or even prohibit remodel projects altogether.

Repairs to existing septic system on inadequately sized lots may require a notice of nonconforming repair on the property deed of records to warn any future owners of the restrictions associated with the septic system.

The business district within Carnation is compromised for area and for the most part this has limited building modification(s) and use, as many of the existing properties have no identified source of sewage disposal, and the existing building structure often occupies the majority of the lot.

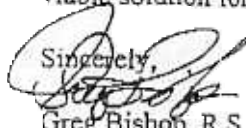
Septic systems installed within the last 12-14 years have been required to address sewage treatment and not just disposal, however without proper operation and maintenance future septic system problems can be anticipated. All septic systems have a life expectancy and as they age a greater number of these failing septic systems will appear.



City of Carnation
September 9, 2003
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Due the large number of aging disposal only systems as well as the restriction as a result undersized lots for septic systems, Public Health supports the development of a sewer system for the City of Carnation. Viewed from the Health Departments perspective it remains the most viable solution for the long-term protection of the public's health.

Sincerely,


Greg Bishop, R.S

Supervisor

Community Environmental Health



City of Seattle King County
Charles Royer, Mayor Tim Hill, Executive

COPY

Seattle-King County Department of Public Health

Bud Nicola, M.D., M.H.S.A., Director

April 19, 1988

The Honorable Mayor Alan Morris
City of Carnation
Carnation, WA 98104

Re: Wastewater Treatment Compliance Schedule

Dear Mayor Morris:

On December 2, 1987, Dr. Bud Nicola declared a public health hazard in Carnation. This action was taken for two reasons:

1. Existing on-site sewage disposal in Carnation is inadequate.
2. Soil conditions in Carnation, in conjunction with current on-site sewage disposal practices, allow untreated sewage to enter the ground water aquifer which is used for drinking water.

The following specific information further supports Dr. Nicola's action

The soils in Carnation generally consist of a fine silt on the surface (Type 4 or 5 by State classification system) underlain by coarse gravels (Type 1) leading to the aquifer at a depth of 15' to 70'. The fine silt layer varies in depth from about 4' to 10'. The most important fact to note here is that there is no restrictive layer of soil protecting the ground water resource from sewage.

Carnation operates an auxiliary drinking water well just at the edge of the commercial area which uses the unprotected aquifer. Our records indicate that the well has a history of bacterial contamination.

Adequate on-site sewage systems, considering the soil profile, consist of very large drainfields installed near the surface where fine soils can treat the effluent before it travels to the gravel zone. However, to allow for small lot sizes created in the past (about 7500 ft²), the practice was to install a small drainfield supplemented by deep gravel sumps allowing the effluent direct access to the gravel zone. Local King County Licensed On-Site Sewage System Installers have verified this information when consulted by our staff regarding past practices.

We have on record at least four commercial establishments which use such a sump system for sewage disposal. Unofficial, illegal "repairs" to failing systems have historically been done without contacting the Health Department for permit and inspection. A homeowner adds a sump to an existing drainfield system which is surfacing and "solves" the problem by allowing the sewage to drain untreated to the aquifer.

2. Every business recently surveyed informally by our staff has an inadequate on-site sewage disposal system. For example:

- a. The Carnation area's only laundromat closed down about one year ago due to inability to accomplish a repair which would prevent large scale recurring episodes of surfacing sewage.
- b. Carnation city staff have related to our field staff that a local tavern experiences backups of sewage into the tavern because it has no drainfield. It uses a small cesspool which has to be pumped "every couple of months or so", according to the owner.

Most businesses have no knowledge of where their sewage systems are. Many of these have no yard whatever where any sort of adequate system could be located. Yet they continue to use these "systems" without maintenance. Apparently the sewage is being disposed of in deep gravel sumps transporting sewage directly to the aquifer. No unmaintained adequate system would operate continually without maintenance in the fine surface soils found in Carnation.

- d. Businesses desiring to expand or remodel have been prevented from doing so. The Health Department is required by state and local regulations to disapprove a building permit application where sewage disposal is known to be inadequate. We are aware that this is severely depressing Carnation's economic viability.
 - e. Riverview School District has expressed a need to site a new High School in Carnation. Current regulations will certainly prevent that given the type of waste generated from chemistry, shop, and art classes, not to mention the cafeteria.
 - f. Current regulations do not allow restaurants on on-site sewage systems. This Department received at least five requests to consider approval of new restaurants in 1987 alone. The denial of these requests is creating an overburden on existing restaurants whose sewage systems are, when not currently in a failure episode just barely functioning.
3. Residential failures consisting of surfacing sewage are common. Repairs are difficult due to small lot sizes (about 7500 ft²). Current regulations require a minimum lot size in these soils of 18,000 ft².

Residents desiring to remodel or expand are often prevented from doing so due to lack of area for expansion of the existing sewage system to meet current regulations.

The above-outlined problems are only getting worse. Existing on-site systems are coming closer to the end of their useful lives. Population increases in the area increase the overall waste load, especially for businesses.

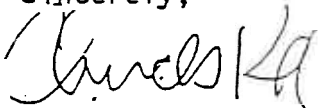
Subsequent to Dr. Nicola's declaration of public health hazard, a grant was applied for from Washington State Department of Ecology for an engineering study associated with developing a public sewage collection, treatment, and disposal system. We understand that it will take approximately one year to complete the Engineering Report/Facilities Plan and have it approved by Ecology.

The Seattle-King County Health Department (SKCHD) will allow 18 months from the contract date with DOE to complete the study and initiate the design/construction phase of the preferred wastewater treatment alternative.

In the event that Ecology does not fund the Engineering Report/Facilities Plan, SKCHD will allow 90 days from date of rejection or no later than August 1, 1988, for Carnation to propose an alternate community remedy for the public health hazard now existing. Subsequently, our only alternative is to seek individual compliance with King County Board of Health Rules and Regulations No. 3. Additionally, new schools, food-processing establishments, laundries, and other high-volume wastewater producers will not be permitted to use on-site sewage disposal.

This compliance schedule is necessary for the protection of public health. We appreciate your cooperation with us. Should you have any questions, please contact Maryanne Guichard, Supervisor, Wastewater Program, at 587-2206.

Sincerely,



Chuck Kleeberg, Director
Environmental Health Division

CK:cbw

cc: Larry McCallum, Washington State Department of Ecology
Water Quality Program
Derek Poon, Resource Planning
James Henriksen, Supervisor, Environmental Health
East District Public Health
Jerry Cox, Senior Sanitarian, East District Health Center
Carolyn Boatsman, Senior Sanitarian, Technical Support